U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-253 098

STATE AIR POLLUTION IMPLEMENTATION PLAN

ENVIRONMENTAL PROTECTION AGENCY

APRIL 1976

153107

EPA-450/2-76-006
April 1976

PB 253 098

STATE AIR POLLUTION IMPLEMENTATION PLAN PROGRESS REPORT JULY 1 TO DECEMBER 31, 1975

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-450/2-76-006	2.
3. RECIPIENT'S ACCESSION NO. PB-253 098	
4. TITLE AND SUBTITLE: State Air Pollution Implementation Plan Progress Report, July 1 to December 31, 1975	5. REPORT DATE: April 1976
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS: U.S. Environmental Protection Agency, Office of Air and Waste Management, Office of Air Quality Planning and Standards, Research Triangle Park, N.C., and Office of Enforcement, Washington, D. C.	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS: U.S. Environmental Protection Agency, Office of Air and Waste Management, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711	13. TYPE OF REPORT AND PERIOD COVERED: Progress, 7/1 to 12/31/75
	14. SPONSORING AGENCY CODE
15. SUPPLEMENTARY NOTES	

16. ABSTRACT

This report features two topics: (1) the current evaluation of all State Implementation Plans (SIPs) to determine by July 1, 1976, those that are "substantially inadequate" and need revisions to attain and maintain the National Ambient Air Quality Standards (NAAQS); and (2) an overview of EPA's carbon monoxide/oxidant control strategies, with an emphasis on control of transportation-related sources of these pollutants. Also included in this report are summaries of SIP-related actions published in the Federal Register during this reporting period, ambient air quality and trend data for 1974, and stationary source compliance information. Since the last report in this series (EPA-450/2-75-008, September 1975), the number of major sources identified has increased by 2,463 to 21,823; 84 percent of these are now in compliance with an emission standard or on an acceptable compliance schedule.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution Air Quality Maintenance Areas Air quality monitoring Air quality standards State Implementation Plans Enforcement	PRICES SUBJECT TO CHANGE	

18. DISTRIBUTION STATEMENT: Release unlimited	19. SECURITY CLASS *(This Report)*: Unclassified	21. NO. OF PAGES: 78
	20. SECURITY CLASS *(This page)*: Unclassified	22. PRICE: 5.00 - 2.25

EPA Form 2220-1 (9-73)

*U.S. GOVERNMENT PRINTING OFFICE: 1976-641-317/5505 Region No. 4

EPA-450/2-76-006

STATE AIR POLLUTION IMPLEMENTATION PLAN PROGRESS REPORT, JULY 1 TO DECEMBER 31, 1975

Prepared by

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

and

U.S. Environmental Protection Agency
Office of Enforcement
Washington, D.C.

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

April 1976

1a

This report has been reviewed by the Office of Enforcement and the Office of Air Quality Planning and Standards of the Environmental Protection Agency and approved for publication.

Document is available to the public through the National Technical Information Service, Springfield, Virginia 22161.

Publication No. EPA-450/2-76-006

FOREWORD

This is the sixth in a continuing series of reports assessing the progress made by states in implementing the Clean Air Act, specifically section 110. Although the report is primarily intended to cover the last six months of calendar year 1975, more recent information is provided when available.

The State Implementation Plans were published in 1972 with an attainment date, in most cases, of May 1975. Measurable increments of progress are occurring at a slower rate than in the first years these plans were in effect. The most readily available procedures and technology have now been implemented for the most part; remaining problems are not yielding as easily to solution. Some of the procedures and technology that have been implemented have been challenged in court, and litigation has affected progress, both by delaying implementation and enforcement and by extending EPA's responsibilities to such programs as prevention of significant deterioration and increased attention to air quality maintenance. Situations that were not anticipated when the Clean Air Act was amended in 1970, such as the energy crisis, have required that different approaches be developed, and this development takes time.

This series of reports is undergoing a change in format that reflects the changing direction and emphasis of EPA's campaign for clean air. The first four reports followed similar formats and generally presented information summarized by EPA region with national totals. The fifth report in the series was the first one to be published after the attainment date, and it provided detailed information by state for the first time. The series will continue to present data on the individual states in the reports for January to June of each year. Because change is occurring at a slower rate, however, these detailed reports will be annual rather than semiannual. The reports for July to December of each year will instead be, like this one, primarily summary reports with certain topics singled out for special focus each time. The feature topics in this issue are the current SIP evaluation process and the status of carbon monoxide/oxidant control strategies.

ACKNOWLEDGMENTS

The preparation of this report resulted from information provided by the state and local air pollution control agencies, the Environmental Protection Agency Regional Offices, and various EPA Headquarters groups.

As with earlier reports relating to State Implementation Plan progress, this edition continues to be a joint effort between the Division of Stationary Source Enforcement, Office of Enforcement, and the Office of Air Quality Planning and Standards, Office of Air and Waste Management.

Information on enforcement activities was provided by the Division of Stationary Source Enforcement, Office of Enforcement. Additional specific information on EPA air programs can be obtained by contacting the EPA Regional Offices.

CONTENTS

	Page
LIST OF TABLES	vii
LIST OF FIGURES	viii
ABBREVIATIONS	ix
I. SUMMARY	1
Development of SIPs	1
SIP Progress	2
Air Quality and Emission Data	3
Stationary Source Compliance	3
Control Agency Resources	4
II. DEVELOPMENT OF SIPs	5
SIP Evaluation	5
Pollutant-Specific Strategies	9
References	16
III. OVERVIEW OF CARBON MONOXIDE/OXIDANT CONTROL STRATEGIES	17
Background	17
Reasonably Available Control Measures	19
Relationship of EPA's Transportation Control Measures to Those of Other Federal Agencies	26
References	29
IV. SIP PROGRESS	31
EPA-Initiated Actions	31
State-Initiated Actions	32
References	33
V. AIR QUALITY AND EMISSION DATA	41
Ambient Air Quality Data	41
Trends in Air Quality, 1970-1974	45
Data Reporting	47
Air Pollution Episodes	48
References	48

CONTENTS (continued)

		Page
VI.	STATIONARY SOURCE COMPLIANCE	51
	Overview	51
	Major Source Categories	54
	References	61
VII.	CONTROL AGENCY RESOURCES	63
	Summary of Resources	63
	Progress of State and Local Air Pollution Control Programs	63

LIST OF TABLES

Table		Page
II-1	Reasonably Available CO and Hydrocarbon Control Measures	14
IV-1	Status of Selected Portions of the State Implementation Plans	34
V-1	National Summary of Air Monitoring Stations Reporting 1974 Data to the National Aerometric Data Bank by September 1975	42
V-2	National Summary of AQCRs Reporting Violations of NAAQS to the National Aerometric Data Bank for 1974	43
V-3	Air Pollution Episodes for August Through December 1975	49
VI-1	Compliance Status of Major Emitters by Region December 31, 1975	53
VI-2	Status of Compliance with Emission Limitations Major Polluting Steel Processes vs. All Major Stationary Source Installations February 1976	59

LIST OF FIGURES

Figure		Page
VII-1	State and Local Air Pollution Control Agency Funds - Actual vs. Need	64
VII-2	State and Local Air Pollution Control Agency Manpower - Actual vs. Need	65

ABBREVIATIONS AND SYMBOLS

AQCR	Air Quality Control Region
AQMA	Air Quality Maintenance Area
CO	carbon monoxide
CY	calendar year
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
FEA	Federal Energy Administration
FHWA	Federal Highway Administration
FGD	flue gas desulfurization
FY	fiscal year
HC	hydrocarbons
I/M	inspection/maintenance
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NO_2	nitrogen dioxide
OAQPS	Office of Air Quality Planning and Standards
O_x	oxidants
SIP	State Implementation Plan
SO_2	sulfur dioxide
State	Refers to the District of Columbia and four U.S. territories as well as the 50 states
TSM	Transportation System Management
TSP	total suspended particulate
UMTA	Urban Mass Transportation Administration
VMT	vehicle miles traveled

I. SUMMARY

DEVELOPMENT OF SIPs

EPA Regional Offices are currently evaluating all State Implementation Plans (SIPs) to identify those that will need revising before the National Ambient Air Quality Standards (NAAQS) may be attained. The schedule is:

- July 1, 1976 -- EPA Regional Offices will call for revisions to SIPs that are determined to be "substantially inadequate" to achieve the NAAQS.
- July 1, 1977 -- States submit revisions that require, as needed, all achievable emission limitations.
- July 1, 1978 -- States submit revisions, if needed, requiring other control measures (generally transportation control and land use measures).

These calls for revision will as a minimum address all areas in which the SIPs are found to be substantially inadequate for attainment, and all Air Quality Maintenance Areas (AQMAs). The evaluation will address each of the five criteria pollutants -- total suspended particulate (TSP), sulfur dioxide (SO_2), carbon monoxide (CO), oxidants (O_x), and nitrogen dioxide (NO_2). Preliminary analysis indicates the following:

- TSP -- More plan revisions will problably be required for TSP than for any other pollutant. In some areas, emission limitations for traditional sources, like fuel combustion and process emissions, are not sufficiently stringent and will need to be revised. In many areas, however, emphasis is changing from the generally well-controlled process stack emissions to fugitive emissions (those from material handling, metallurgical operations, etc., that do not come from a stack or vent). Regulations being developed for fugitive emissions depend on reasonably available

controls to be effective. Control programs are also being developed for some nontraditional sources of TSP, such as fugitive dust and secondary particulates.

- SO_2 -- Enforcement of existing regulations is expected to result in attainment of SO_2 standards in most areas, so relatively few revisions are anticipated for this pollutant.
- CO/O_x -- Attainment of CO and O_x standards depends primarily on control of emissions from transportation-related sources. In addition to the Federal new motor vehicle pollution control program, reasonably available categories of control measures include inspection/maintenance, transit improvements, employer incentives, and parking and traffic management. The Department of Transportation and the Federal Energy Administration now have transportation-related programs that should facilitate further progress in this area. In addition, stationary sources of hydrocarbons may be controlled to reduce O_x through such measures as vapor controls for organic solvent usage and gasoline vapor recovery in marketing operations.
- NO_2 -- Valid data, though limited, indicate that the NO_2 problem is much less severe and pervasive than the TSP or O_x problems; maintenance of NO_2 standards will be more of a problem than attainment. The vast majority of NO_x emissions is produced by fuel combustion in both stationary and mobile sources. Stationary source control measures will become increasingly important as additional mobile source control regulations are implemented.

SIP PROGRESS

The SIPs continue to be amended. No plan is currently fully approved, although the degree to which each plan is disapproved varies from state to state.

During this report period, EPA proposed regulations for air quality maintenance, an SO_2 control strategy for the State of Ohio, and regulations for certain smelters in Montana and Arizona. The Agency promulgated nationally applicable regulations for state programs for continuous monitoring of emissions from four categories of existing sources.

Regulations were also promulgated for a copper smelter in Utah, for public comment provisions for previously published new source review regulations in five states, and for public availability of data in 24 SIPs. During this period, 34 state plan proposals and 26 approvals of state-initiated actions were published in the Federal Register.

AIR QUALITY AND EMISSION DATA

The status of air quality in the United States in 1974 was in many respects similar to that for 1973. Approximately the same percentages of reporting stations are still exceeding air quality standards, with one exception: an apparent decline in the proportion of stations exceeding the 8-hour CO standard.

The historical data base is sufficient to determine air quality trends in many areas for TSP and SO_2. Based on composite annual average data from 1096 TSP monitoring sites, the ambient concentrations of TSP have been reduced by about 17 percent during the period 1970-1974. Similar data from 258 SO_2 monitoring sites indicate that ambient concentrations of SO_2 have been reduced by approximately 32 percent during the same period.

STATIONARY SOURCE COMPLIANCE

Enforcement of standards at stationary sources has focused on the 21,670 identified major emitters which account for about 85 percent of all air pollution from stationary sources. By December 1975, EPA and the states had brought 18,327 of them into final compliance or placed them on firm schedules leading to compliance. A recent study indicates that since the passage of the Clean Air Act Amendments of 1970, compliance with Federal, state and local laws kept over 26 million tons of TSP and 7.6 million tons of SO_2 out of the nation's air. However, ambient standards are still being violated in a number of AQCRs. The states and EPA are now conducting extensive analyses to determine the reasons for non-attainment, including the identification of specific major and minor sources contributing to the problem. Analyses have indicated that several categories of minor sources (e.g., small boilers, incinerators, etc.) are contributing to air quality problems. In addition, several major source

categories are not achieving compliance with standards. These are coal-fired power plants, integrated iron and steel facilities and coking plants, and primary smelters.

CONTROL AGENCY RESOURCES

In 1975, 55 state and territorial agencies and 236 local agencies, working in coordination with states, expended approximately $148 million and 7000 man-years to carry out the major portions of the regulatory and enforcement aspects of the national air pollution control effort. In Fiscal Year 1975, state and local funds for air pollution programs increased 20 percent ($17 million) over FY 74 levels, and Federal support during this period increased by 2 percent ($1.6 million).

II. DEVELOPMENT OF SIPs

SIP EVALUATION

The attainment date for primary National Ambient Air Quality Standards (NAAQS) for most states was May 31, 1975. Since that date, EPA has intensified its efforts to identify those areas that are not now attaining the NAAQS and that are not expected to attain the NAAQS after full State Implementation Plan (SIP) implementation, which has been delayed in some cases. Preliminary assessments of the areas not expected to attain were given in the previous report in this series.[1] EPA Regional Administrators are now examining all SIPs more closely to identify those that will require revisions before the NAAQS may be attained. These evaluations are being performed for all areas of the nation for each of the five criteria pollutants: total suspended particulate (TSP), sulfur dioxide (SO_2), carbon monoxide (CO), oxidants (O_x), and nitrogen dioxide (NO_2).

Section 110(a)(2)(H)(ii) of the Clean Air Act as amended requires that SIPs provide "for revision, after public hearings, of such plan . . . whenever the Administrator finds on the basis of information available to him that the plan is substantially inadequate to achieve the national ambient air quality primary or secondary standard which it implements" (emphasis added). Prior to July 1, 1976, the Agency plans to call for revisions to those existing SIPs that are determined to be substantially inadequate for attainment. These calls for revisions will specify the schedule for submission of revisions and require that, to the extent needed to meet national standards, all achievable emission limitations must be submitted by the state as SIP revisions by July 1, 1977. The term "achievable" is intended to require reasonable "technology forcing" if necessary, rather than simply "off the shelf" technology. Any other control

measures (generally referring to transportation control and land use measures) necessary for attainment and maintenance must be submitted by the state by July 1, 1978. (NOTE: This is not intended to imply that some land use and transportation measures are not considered reasonable. These measures, though considered reasonable, generally require more time to implement due to need to obtain enabling legislation.)

These calls for revision will address as a minimum (1) all areas in which the SIPs are found to be substantially inadequate for attainment, and (2) all Air Quality Maintenance Areas (AQMAs). In many AQMAs, a formal demonstration of maintenance will be needed. However, flexibility is necessary in determining what constitutes an adequate demonstration of maintenance.

In general, SIPs deficient in maintenance provisions should be corrected as expeditiously as practicable and at the same time as attainment deficiencies are corrected. Nonetheless, action to correct those maintenance deficiencies may need to be deferred if immediate action would not be sensible or would interfere with actions needed to expeditiously correct attainment deficiencies. Similarly, action to correct deficiencies in plans to attain the secondary NAAQS may need to be deferred if that action would interfere with actions needed to expeditiously correct deficiencies in plans to attain the primary NAAQS.

The decision to call for a plan revision will be made only after (1) detailed analysis of the status of air quality, the restrictiveness of the existing regulations, and the status of major compliance actions; and (2) thorough discussions with all pertinent program elements in the Regional Office and with the affected state and local control agencies.

The Agency must exercise good judgment in determining whether the control strategy portion of an approved SIP is inadequate to achieve national standards on a timely basis. It is the Agency's policy to request such plan revisions only where they are clearly necessary. To declare that a SIP is substantially inadequate will imply a need for new and more stringent emission limitations. It will take some time to develop such limitations. Pollution sources might use this opportunity to resist coming into compliance with existing regulations and, thus, ongoing abatement actions

could be inhibited. Further, frequent revisions, particularly where they affect emission control requirements, are undesirable in that they confront source owners with a "moving target."

Another factor to be considered is that any plan revision submitted by a state that changes some part of the SIP or that adds a new part could result in a challenge by the affected sources to the changed or added part. (Section 307 of the Act provides for a process of judicial review of the Agency's action in approving or promulgating any implementation plan or revision thereof.) Experience indicates that substantial delays in enforcement can result from such challenges. Nevertheless, if revisions are clearly necessary, EPA will not hesitate to call for them. The Agency has published guidance on criteria to be considered in deciding whether revision is necessary.[2]

Determining whether a SIP is substantially inadequate to attain national standards will, in general, be a difficult task. The basic problem is to determine whether Air Quality Control Regions (AQCRs) are progressing satisfactorily toward attainment of national standards as sources come into compliance with emission limitations contained within the SIP. The decision must be based on consideration of the following types of factors:

1. Factors favoring a finding that the SIP <u>is not</u> substantially inadequate:
    a. Available data provide a reasonable expectation that NAAQS have been or will be achieved by the currently approved SIP under provisions of the existing control strategy.
    b. The most recent air quality data are below or not far above NAAQS.
    c. Much abatement work is ongoing or yet to be completed under existing regulations.
    d. Air quality and emission data are not yet extensive in terms of time and geographical coverage.
    e. Air quality levels have varied erratically up and down in recent years and a clear trend is not yet determinable.
    f. Emission control regulations have been made more stringent or more comprehensive in the past 1 to 3 years but are not yet fully implemented.

g. Existing regulations are very stringent -- at or bordering on a requirement that all reasonable control measures that can be implemented are being used.

h. Major reductions in emissions have been made in the past year or two and perhaps more reductions are programmed for the near future.

i. The governmental air pollution control program has grown substantially in the past few (1 to 3) years and enforcement actions are being intensified.

2. Factors favoring a finding that the SIP <u>is</u> substantially inadequate:

a. There is good evidence that compliance with existing regulations will not result in achieving NAAQS by the existing attainment data.

b. Recent air quality levels are substantially above NAAQS, and air quality and emission data are generally accurate and extensive as to time series and geographic coverage.

c. Most existing regulations have been fully implemented; future improvement in air quality under existing regulations will not be substantial.

d. Air quality levels over the past few years show an evident trend which, in consideration of anticipated abatement, shows clearly that NAAQS will not be attained by existing control measures.

e. Emission control regulations have not changed greatly in recent years.

f. Existing regulations are not particularly stringent and do not include all emission limitations which it is reasonable to anticipate will be achievable within a reasonable period of time.

g. Air quality has shown little change over the past 1 to 3 years (and levels are above NAAQS).

h. Governmental control activities have been reasonably adequate for the past few years (1 to 3) and regulations are probably enforced well.

It should be noted that judgments about ambient air quality data cannot be based on numbers alone. The fact that ambient data exceed a national standard by 10 or 15 percent does not in itself indicate an immediate need for a plan revision. Clearly, the normal variation of ambient air quality due to meteorological conditions, etc., may cause such a condition to exist. The requirement of "substantially inadequate" provides the Regional Office with flexibility in assessing the need for, and especially the timing of, a call for plan revision. In some cases, little or no ambient air quality data exist to allow for a determination of the adequacy of the SIP. For example, in many cases, nitrogen dioxide data may not be available due to the controversy concerning the original reference method. While adequate and sufficient data should exist in many major urban areas (due to the special field projects over the past few years), sufficient data may not be available for some areas. In these cases, any decision on attainment and the need for plan revisions may have to be delayed.

POLLUTANT-SPECIFIC STRATEGIES

This discussion of the current SIP evaluation process has thus far dealt only with general considerations. In the actual analysis of a SIP, however, the problems affecting attainment and maintenance of NAAQS for each of the criteria pollutants must be treated separately. Described below are pollutant-specific strategies that may be considered if a SIP is determined to be inadequate for that pollutant.

Total Suspended Particulate (TSP)

As discussed in the previous report in this series,[1] many areas are not expected to attain the NAAQS for TSP, and EPA anticipates that more plan revisions will be required for TSP than for any other pollutant. The regulations in many cities do not now require all reasonably available control technology, and additional measures for making further improvements are becoming better understood. Also, most of the initial abatement efforts for TSP are nearing completion, and in most situations SIP revisions should not interfere with current control efforts.

In order to determine that a SIP is substantially inadequate to attain the NAAQS for TSP, a preliminary analysis of the problems and possible

control strategies must be made. This must be followed by a more detailed investigation of the factors affecting attainment and the efficacy of candidate control strategies. These investigations will rely on a variety of techniques for determining the factors affecting attainment. A number of these techniques (analysis of ambient and source data, modeling, etc.) have been used for some time. However, a few techniques (microscopy, directional and short-interval sampling) are newer and have not been widely applied. They are nonetheless useful and constitute one input into the decision process.

The first step in a problem investigation is a review of air quality data. Trends, variations between sites and neighborhoods, meteorological influences, patterns in 24-hour readings between sites, and wind direction when the sample was taken are all useful parameters in determining the potential factors affecting each site. A critical review of the compliance status of industries subject to present regulations must then be made. Based on this review and using data from stack tests, emission factors and operating parameters, an inventory of emissions in the area is made. Point sources are assigned to grids on an area map, and smaller (area) sources and transportation sources are apportioned to these grids by population and other factors. Finally, a dispersion model can be used to simulate the air quality patterns over the study area, which will help predict new air quality patterns due to growth or due to changes in regulations and emissions from enforcement. When properly evaluated and interpreted, inventories and modeling are useful tools for air quality planning.

A second technique being used is the analytical and physical examination of filter samples to determine their elemental, chemical and morphological properties. Provided that sufficient quality assurance measures are taken, these analyses in concert can provide valuable information on the aerosol constituents and thus the sources of ambient particles. These analyses are, however, still under development and have not been routinely applied.

Special field studies are also being used to determine sources of atmospheric particles. Particle size sampling, directional sampling, and sampling for short consecutive time intervals and at various distances and heights from suspected sources provide valuable information. Unfortunately,

the long lead time required to set up such a field study and the developmental nature of some of the sampling equipment have hindered widespread application.

Studies within EPA,[3,4,5] while not yet complete, are identifying the factors affecting attainment in many urban areas. Traditional sources such as fuel combustion and process emissions still play an important part, but nontraditional sources such as sources of fugitive dust, secondary particulates and automotive particulates are being recognized as a major element in the particulate problem. In addition, variations in meteorology play an active role in determining regional variations in particulate levels. The impacts of certain parameters such as rainfall, windspeed, and heating degree days are being investigated.

Through implementation of existing SIPs, most traditional sources have been effectively controlled in many areas. In those areas where regulations are less stringent and traditional sources are a significant problem, the regulations will be strengthened. Methods of determining compliance must also be reviewed in these same areas. As more and more traditional sources are controlled, the emphasis of control strategies for TSP in these areas will be changing from control of traditional sources to the newer issue of control of nontraditional sources. The following sections on control strategy alternatives outline some of the possible strategies which may be considered for both traditional and nontraditional sources. Final determination of the most effective control strategy must be made within each area.

Control Strategy Alternatives: Traditional Sources -- Emissions from traditional sources such as process emissions are still significant contributors to the particulate problem, but emphasis is changing from the generally well-controlled process stack emissions to fugitive emissions (emissions from material handling, metallurgical operations, etc., that do not come from a stack or vent). Most agencies do not yet have specific regulations for control of fugitive emissions; they rely on nuisance regulations or general regulations requiring the use of reasonable precautions in abating these emissions. A few agencies, however, have used regulations of more effective types. These require the use of proper operating procedures,

control devices or other prescriptive measures. Both the general and the specific regulations depend upon the existence of reasonably available control technology to be effective.

Other traditional sources such as fuel combustion for power generation and smaller boilers are generally within existing emission limits for particulate matter; however, some tightening of these limitations could be applied in selected areas. For example, small boilers and furnaces burning fuel oil can improve combustion with good maintenance, and new or replacement units can be designed more efficiently.

Reasonably available control technology (RACT) may be required for selected industries and in those areas where traditional source emissions are a particular problem.

Control Strategy Alternatives: Nontraditional Sources -- Fugitive dust is the term generally used to describe windblown dust or nonindustrial dust generated by human activity, e.g., dust from construction, unpaved roads, and parking, and resuspended dust from paved roads. Construction dust may be partially controlled by minimizing the acreage disturbed and watering the site. Watering can also reduce the dust from demolition areas. Unpaved roads can be paved in inhabited areas with high traffic densities. Heavily used parking areas can be paved, or treated to suppress dust. Control of spillage and carryout from muddy, unpaved surfaces can reduce the amount of dust on paved roads, and cleaning by vacuuming may be justified in extreme cases.

Secondary particulates are formed by the reaction of gases in the atmosphere. Sulfates, nitrates, ammonium salts and organics are commonly found secondary particles. Sulfate, the most commonly found secondary particulate, is formed by the atmospheric oxidation of SO_2. Current policy calls for continuation of existing regulations in high SO_2 areas to prevent increased health risk from sulfates.[6] Control strategies for secondary particulates are presently being investigated; final action must wait until health risks can be determined.

Total automotive particulates are reduced significantly by the low-lead and no-lead gasolines and will be increasingly reduced as the percentage of cars which rely on these blends of gasoline increases.

Other source categories which will probably receive less direct regulation are rubber tire fragments, agricultural tilling, and windblown dust.

Sulfur Dioxide (SO_2)

Non-attainment of NAAQS for SO_2 at this point is considered to result primarily from delayed implementation of existing regulations for emissions from power plants and non-ferrous smelters. The keys to maintenance of the standards are regarded to be new source review, enforcement of non-significant deterioration regulations, and optimum implementation of the provisions of the Energy Supply and Environmental Conservation Act. Therefore, relatively few SIP revisions are expected to be necessary for this pollutant.

Carbon Monoxide and Oxidants (CO and O_x)

Oxidant and carbon monoxide concentrations are expected to improve somewhat in most areas of the country as controlled automobiles replace older, uncontrolled vehicles. Even with substantial improvement in air quality for oxidants and carbon monoxide, however, a large number of AQCRs are expected to experience violations of the ambient standards during the next 10 years. At least 63 urban areas will require transportation control measures in order to attain standards by 1985. Twenty-nine of those areas currently are required to implement transportation control measures, while transportation control measures are in some stage of development for nine additional areas and are likely to be required for the remaining 25 areas[7] (see Chapter III).

Table II-1 presents a list of reasonably available categories of CO and hydrocarbon control measures,[8] which are described in more detail in Chapter III. The emission reduction potential of each measure varies among areas, depending on available technology and the relative contributions of stationary and mobile sources. Feasibility is generally defined in terms of cost-effectiveness and ease of implementation (i.e., political, administrative, and technological viability). The feasibility also varies among areas -- particularly regarding the transportation measures. It is important to note that the Department of Transportation (DOT) is now requiring

Metropolitan Planning Organizations (MPOs) to develop and implement an annual Transportation Systems Management (TSM) Plan (see Chapter III) which should consider the transportation measures listed in Table II-1. Every strategy in this table is considered reasonably available and should be included in SIP revisions where necessary for attainment. However, the most cost-effective mix of measures must be locally determined.

Table II-1. REASONABLY AVAILABLE CO AND HYDROCARBON CONTROL MEASURES[8]

Source control measures	Transportation measures
1. Inspection/maintenance	1. Transit improvements
2. Vapor controls for organic solvents	2. Employer incentives
3. Petroleum refinery, chemical plant and other industry controls	3. Parking management/restrictions
4. Vapor controls for gasoline marketing	4. Traffic management/restraint
5. Heavy duty vehicle retrofits	

The process for identifying needed SIP revisions in non-attainment areas is the same for areas with an existing CO/O_x SIP as for areas without such a plan. Generally, the schedule will require states to submit by June 30, 1977, reasonably available measures needed to meet the NAAQS. If necessary, states will be allowed until June 30, 1978, to submit certain measures that require longer development and implementation times. This special category of reasonably available measures generally includes land use and transportation control measures that often require longer lead times to obtain regulatory authority and funding.

Therefore, during the next several months EPA Regional Offices will concentrate first on validating and documenting the data base which demonstrates the need for CO/O_x SIP revisions. Where pervasive oxidant problems exist, states may elect to work jointly in developing uniform control

strategies over a broad multi-station region. Where resources permit, the regions are also encouraged to develop draft strategies jointly with the local transportation agencies responsible for planning implementation. EPA is preparing guidance material to assist states in formulating SIP revisions for oxidants.[9,10,11]

Nitrogen Dioxide

On a national basis, the NO_2 problem is much less severe and pervasive than the TSP or O_x problems. Valid data indicate that only a few areas of the country have ambient NO_2 concentrations in excess of the NAAQS for NO_2. The typical NO_2 problem, where it does exist, is in an urban area where observed NO_2 concentrations are either slightly above or below the NAAQS. Such conditions generally represent a potential problem for maintenance rather than for attainment of the NAAQS. Further, it is now believed that continued growth of nitrogen oxide (NO_x) emissions from mobile and stationary sources in a number of cases will make it impossible to maintain national standards, even if they are not presently exceeded, without additional emission control measures.

On a national basis, stationary sources and mobile sources currently contribute 60 percent and 40 percent of the NO_x emissions, respectively. In both emission categories, the vast majority of NO_x emissions is produced by fuel combustion (fossil fuel-fired power plants, industrial boilers, commercial/residential space heating units, gasoline-powered automobiles, diesel-powered trucks, aircraft, etc.).

Stationary source control measures will become increasingly important as additional mobile source control regulations are implemented. Future violations of the NO_2 standard are predicted to occur in some areas regardless of whether more restictive automotive NO_x emission limitations are adopted because of growth of stationary source emissions. Control measures are reasonably available and will be required (as needed) for utility-type boilers. Additional control measures will be required if necessary; however, NO_x control techniques are not reasonably available for all source categories. EPA is writing a manual[12] on preparing SIP revisions for NO_2, and it will contain an assessment of the methods available for controlling existing sources.

Difficulties with ambient NO_2 monitoring techniques have been resolved, and the continuous chemiluminescent measurement principle and associated calibration procedure have been proposed as the new Federal Reference Method.[13]

REFERENCES

1. State Air Pollution Implementation Plan Progress Report, January 1 to June 30, 1975, U.S. Environmental Protection Agency, EPA-450/2-75-008, September 1975.

2. Guidelines for Determining the Need for Plan Revisions to the Control Strategy of the Approved SIP. OAQPS Guideline No. 1.2-011, November 1975.

3. National Assessment of Particulate Problem, study in progress for EPA by GCA Technology Division. Estimated completion date April 1976.

4. Guideline Development for Reasonable Control of Fugitive Dust, study in progress for EPA by TRW, Inc. Estimated completion date July 1976.

5. Southwest Pennsylvania Particulate Study, study in progress for EPA by H. E. Cramer. Estimated completion date January 1977.

6. Position Paper on Regulation of Atmospheric Sulfates, U.S. Environmental Protection Agency, EPA-450/2-75-007, September 1975.

7. Transportation Controls, Part III: "Air Quality Data," paper prepared by EPA's Office of Transportation and Land Use Policy for the Senate Committee on Public Works, January 16, 1976.

8. "Policies for the Inclusion of Carbon Monoxide and Oxidant Controls in State Implementation Plans (TCP Policy Paper)," EPA position paper prepared by the Office of Transportation and Land Use Policy, December 1975.

9. O_x Control Strategy Manual, scheduled for distribution to Regional Offices, May 1976.

10. "Guidelines for Control of Volatile Organic Emissions from Existing Stationary Sources," draft scheduled for distribution to Regional Offices in April 1976.

11. "Policy Statement on Use of the Concept of Photochemical Reactivity of Organic Compounds in SIPs for Oxidant Control," distributed to Regional Offices January 29, 1976.

12. NO_x Control Strategy Manual, scheduled for distribution to Regional Offices May 1976.

13. Federal Register, Vol. 41, p. 11252, March 17, 1976.

III. OVERVIEW OF CARBON MONOXIDE/OXIDANT CONTROL STRATEGIES

BACKGROUND

EPA's primary methods of dealing with carbon monoxide and oxidants (and oxidants' precursor, hydrocarbons) can be divided into two categories: stationary source control and transportation control measures. The primary emphasis of this chapter will be on transportation control measures.

Programs for the control of transportation-related air pollution have had a number of problems from the start--problems which new policies and proposed amendments to the Clean Air Act will attempt to resolve. First, information on the effectiveness, cost, and implementability of transportation options in 1973 was limited. The extremely tight court-imposed time constraints did not allow for the investigation of social and economic effects on a case-by-case basis. In addition, experience was lacking at all levels of government to plan and implement effective measures. Due to the time restrictions, many of the transportation control requirements could not be adapted to the existing institutional framework, to ongoing planning schedules and processes, and to agency budget cycles. The 1977 deadline for achieving health-related national ambient air quality standards also did not allow credit for long-range measures such as mass transit improvements. Consequently, the alternatives considered and the effects analyzed were both limited, and governmental and citizen interaction was insufficient.

Litigation has hampered implementation of transportation control measures. When required by court decision to develop transportation plans for many states in 1973, EPA realized that it would be undesirable (and impractical) to promulgate local transportation control measures which would be administered at the Federal level. EPA thus promulgated implementation plan regulations requiring state and local agencies to abate transportation-related pollution.

Several states tested the legality of this approach in the Federal Courts. In 1974, the First and Third Circuit Courts of Appeal generally supported EPA's promulgations.[1] In 1975, however, three Courts rejected EPA's promulgations in whole or in part.[2]

The Fourth and Ninth Circuits basically ruled that the Act does not allow EPA to promulgate regulations which would impose civil or criminal sanctions on a state or its officials for failure to administer EPA-promulgated regulations or to provide legislation in accordance with those regulations. While these Courts technically based their decisions on interpretations of the Clean Air Act, they left little doubt that they would view the Act as unconstitutional if it did authorize EPA to require states to control such air pollution. Neither decision suggested that EPA could not directly control the polluting activities or that the states could not if they chose to do so.

The decision of the D.C. Circuit took a middle ground between the Third Circuit on one hand and the Fourth and Ninth Circuits on the other hand. The D.C. Circuit decision considered both the statutory and constitutional issues and held that EPA could require states to conduct certain activities (such as bus lanes) because in these areas the state was effectively the owner or manager of a pollution source, e.g., highways. But the Court said EPA could not require states to pass legislation necessary to implement programs regulating private pollution sources (e.g., inspection or retrofit of individual autos). States could, however, be required to comply with rules regulating commerce (e.g., auto registration), which would result in helping to enforce EPA regulations.

Because of the conflicting decisions on this issue, the Justice Department has asked for Supreme Court review. A decision on the cases appealed will probably take many months.[3]

Prior to the recent judicial decisions concerning EPA's enforcement authority, EPA had issued notices of violation under section 113 of the Act to several state and local governments, particularly for the failure to implement periodic emission inspection programs for in-use vehicles. Since the judicial decisions have been rendered, EPA has not pursued any of these enforcement actions, although it is not precluded from doing so

in several of the affected areas. Because of these decisions, EPA finds itself in the situation where the areas most heavily affected by mobile source-related pollutants have plans on the books to reduce their pollution problems, but EPA is unable to effectively require these areas to implement the necessary control measures.

In all, 29 general areas now require the use of some type of transportation control measure.[4]

1. Boston, Mass.
2. Springfield, Mass.
3. New York, N.Y.
4. Rochester, N.Y.
5. Northern New Jersey (Newark, N.J.)
6. Southern New Jersey (Camden-Trenton)
7. Philadelphia
8. Pittsburgh
9. Baltimore
10. Washington, D.C.
11. Cincinnati
12. Indianapolis
13. Chicago
14. Minneapolis
15. San Antonio
16. Houston-Galveston
17. Dallas-Ft. Worth
18. Denver, Colorado
19. Salt Lake City, Utah
20. Phoenix-Tucson
21. Fresno
22. San Francisco
23. San Diego
24. Los Angeles
25. Sacramento
26. Seattle
27. Spokane
28. Fairbanks
29. Portland

In addition, the following cities are in some stage of development of transportation control strategies:

1. Hartford, Conn.
2. Providence, R.I.
3. New Haven, Conn.
4. St. Louis, Mo.
5. Tampa, Fla.
6. Beaumont, Texas
7. Corpus Christi, Texas
8. Albuquerque, N.M.
9. Las Vegas, Nev.

REASONABLY AVAILABLE CONTROL MEASURES[5]

No entire CO/O_x control strategy has been implemented to date, but progress has been made in implementing individual control measures. Several of these measures, which have been categorized as "reasonably available" (see Chapter II), are discussed in the following sections. These measures include both transportation control measures, such as inspection/maintenance, transit improvements, employer incentives, traffic management/restraint, and parking management/restrictions, and stationary source control measures such as vapor controls for gasoline marketing.

Inspection/Maintenance

Motor vehicle inspection and maintenance (I/M) is a program of periodic inspection of vehicles to determine the levels of emissions from the vehicles. I/M is part of the transportation control strategies in 27 areas, which contain over 30 percent of the nation's automobiles. Six areas are currently operating I/M programs: New Jersey; Chicago; Cincinnati; Portland, Oregon; Riverside, California; and Phoenix-Tucson, Arizona.

Under I/M, vehicles found to emit excessive amounts of pollutants are either required or requested to be repaired and reinspected. (Three of the six I/M programs currently in operation call only for voluntary maintenance.) Two types of inspection tests are used. An idle test measures tailpipe emissions by an exhaust gas analyzer while the vehicle is in neutral. In the more accurate and more costly loaded test, the vehicle is run under simulated driving conditions on a dynamometer.

Air quality improvements from I/M are difficult to quantify, but some emission reduction figures are available. Depending upon the mix of stationary and mobile sources in an area, it is estimated that I/M programs can obtain 2 to 6 percent of needed reductions in hydrocarbon emissions and 5 to 10 percent of the needed carbon monoxide reductions.[6]

Transit Improvement

Transit improvement measures refer to any upgrading of transit services intended to attract additional ridership. These measures will, in most cases, have an impact on air quality. To attract new riders, a transit system must have sufficient vehicles to carry the new riders, provide service of a quality comparable to automobiles, and be provided at an attractive cost.

There are three main types of transit improvement measures:

1. Fare reduction -- Transit has always suffered a significant cost disadvantage because of the underpricing of automobile use. This can be adjusted by reducing fares or increasing the cost of automobile use. A fare reduction from 40 cents to 15 cents in Atlanta brought about a 28 percent increase in ridership. This type of fare decrease generally increases ridership at off-peak times.

2. Fleet expansion -- Increases in the number of transit vehicles can promote ridership increases by allowing for more frequent service on existing lines and enabling the development of new lines and new types of transit service. The Metropolitan Transportation Commission in Minneapolis nearly tripled its bus fleet between 1970 and 1976, with a resulting ridership increase from 45,000,000 to 63,000,000. Service expansion may also include the use of smaller transit vehicles designed to fill the gap between conventional transit and the private automobile, e.g., demand-responsive transit.

3. Passenger amenities -- Shelters, vehicle design, better schedule information, and terminal facilities are aspects of transit service that are most visible to the public. The potential passenger's attitude toward transit service, based in large part on these amenities, will influence his decision between transit and the automobile.

Employer Incentives

An employer incentive program is one in which employers develop programs to encourage their employees to participate in carpools, vanpools, mass transit, etc. In several areas, such as northern New Jersey and Boston, employer incentive programs were promulgated as part of transportation control plans. Generally, they require assistance from the employers in carrying out pooling programs.

An effective carpool program can potentially reduce automobile emissions by 5 to 10 percent. Individuals can save from $200 to $350 per year in operating costs by participating in a pool and another $500 per year in ownership expenses if a car can be eliminated. Vanpooling programs have similar benefits. For example, an eight-member vanpool in which all of the members previously drove 30 miles to work would reduce vehicle miles of travel by 82,000 per year and save 6,000 gallons of gasoline per year. The 3M Company of St. Paul has the most extensive vanpool program in the country--over 75 12-passenger vans. A $1 fare per day per rider covers the full fixed and operating costs. At the 3M Company, calculations based on in-use operation of 57 vans showed that these vans saved over 340 parking spaces, 1.4 million vehicle miles of travel, and 108,000 gallons of gasoline each year. In addition, the company has been able to save close to $3 million by eliminating the need for a new parking garage.

Traffic Management/Restraint

Several traffic management and traffic restraint measures are available:

1. Preferential treatment of high-occupancy vehicles -- EPA views preferential treatment of buses and carpools as a critical incentive which must be in use before selective automobile disincentives, such as parking restrictions, can be considered. Bus/carpool priorities have been provided on freeways, urban arterials, and secondary city streets. Freeway measures include exclusive lanes (both grade-separated and reserved) and ramps, contraflow lanes, and right-of-way bypass privileges at ramps and toll plazas. Priority treatment on city streets includes bus-only streets, bus-only lanes (both median and contraflow), contraflow lanes, and bus preemption of traffic signals. Bus priority treatment can attract a significant number of auto travelers to transit during the peak period, thereby increasing bus speeds and service reliability and decreasing congestion.

Cities that have implemented priority bus/carpool measures on freeways include Washington, D.C., Los Angeles, Seattle, Long Island, and San Francisco/Oakland. Preferential treatment for buses on city streets has been initiated in Philadelphia, Minneapolis, Chicago, New Orleans, and Washington, D.C., among others.

2. Road user charges -- Tolls are being increasingly used to spread out peak-hour traffic and selectively control traffic patterns. This method of controlling traffic patterns creates a pricing structure for the use of the road, thereby creating an incentive/disincentive situation. A big advantage of road user charges is that the rate can be readily increased or decreased depending upon the situation and the result desired. A differential license road use charge has been used in Singapore with dramatic decreases in vehicle miles traveled.

3. Traffic flow improvements -- Reductions in air pollution are available through optimizing traffic flow. Improvements can be made in three general ways:

a. Traffic surveillance and control use various techniques aimed at increasing the supply of usable roadway or controlling the demand for existing roadways. This method might include,

for example, planning, redesigning facilities, monitoring ramp usage, roadway surveillance and information communication to individual vehicles.

b. Traffic simulation models are planning tools used to predict the consequences of various alterations in the pattern of traffic flow, either on the macroscopic or microscopic level.

c. The maximum use of existing street facilities can be achieved through the use of signalization, land use, and directional control and channelization of turning traffic.

4. Staggered work hours -- Staggered work hours can help reduce peak loads on transit facilities and vehicle loads on streets and highways by altering the working hours of employees. By spreading out the peak period, transit capacity can be increased. This measure is primarily a congestion control device and not a direct air pollution control device. However, peak hour pollution may be reduced by changing the emission patterns of mobile source pollution during these periods.

The effect of any staggered work hour program on pollution reduction depends on a variety of factors. Major factors include the degree of flexibility of the program, extent of mobile source pollution in the area, and availability of alternative modes of transportation and nearby parking facilities. A staggered work hour program may have wide-ranging effects on various social institutions, and these impacts should be given full consideration before any such program is implemented.

The New York Port Authority directed a staggered work-hour project, and surveys indicate that congestion decreased significantly in elevators, transit facilities, and surrounding streets.

5. Auto-free zones -- Auto-free zones are geographic areas which are partially or fully restricted to vehicular traffic in order to facilitate pedestrian flow. The basic types of zones can be defined as follows:

Fully pedestrian: All traffic is banned from the streets at all times, the streets are repaved to facilitate pedestrian flow, and various environmental improvements are made.

Partially pedestrian: Similar to a fully pedestrian zone except that limited vehicular traffic (delivery vehicles, public transportation) is allowed during restricted hours.

Selected traffic bans: Selected classes of vehicles are banned and various environmental improvements are made.

Occasionally pedestrian: Total vehicular ban during certain specified occasions.

Because of the nature of this air pollution control technique, the various projects should be instituted in stages to cause as few dislocations as possible. Since vehicular flow is prohibited in given areas, suitable alternative traffic patterns must be established to accommodate the dislocated traffic.

The extent of the benefits conferred by this type of program depends on the amount of mobile source air pollution in the region, geographical area of the zones, and alternative modes of transportation provided. CO levels and noise pollution have been dramatically reduced in several of the cities having auto-free zones. Significant auto-free zones have been created and are in the process of being constructed in major United States cities (Minneapolis, Fresno and Baltimore, among others) and abroad (Copenhagen, Cologne, Leeds and Montreal).

Parking Management/Restrictions

Parking control strategies include measures that affect both the availability and the cost of parking. These strategies include a wide range of measures which can be implemented alone or in combination with other parking, transit, and carpool strategies. Measures designed to influence the availability of parking include park-and-ride lots at outlying transit stops, on-street commuter parking bans, residential permit systems for neighborhoods greatly affected by on-street commuter parking, zoning law changes where excessive amounts of parking are required with new building construction, and review of new proposed parking facilities for air quality acceptability.

Other parking measures are designed to directly affect the cost of parking and thereby influence the demand for parking. These measures are generally more controversial and politically sensitive than parking availability measures and include parking rate increases, parking surcharges, changes in the parking rate structure to eliminate the current advantages given to long-term commuter parking, and elimination of free or low-cost employer-subsidized parking for employees.

These measures collectively are referred to as parking management. Parking management is a relatively new concept designed to partially redress traditional policies of nearly unrestrained support of the automobile by helping to achieve a better balance between automobile use on the one hand, and public transit, carpooling, bicycling and walking on the other.

Gasoline Vapor Recovery

Gasoline vapor control regulations require the control of evaporative hydrocarbon emissions during the storage, transport and dispensing of gasoline. Stage I regulations require control during loading at the bulk terminal and during delivery to the service station storage tank. Stage II regulations require control during the fueling of automobiles at the service station.

Stage I equipment consists primarily of hoses and couplings to establish a "closed loop" between the delivery tanker and the underground storage tank. Stage II vapor recovery involves two basic control approaches. Balance systems create a "closed loop" by achieving a tight seal between a gasket on the dispensing nozzle and the neck of the vehicle gasoline tank. Vapors are forced back to the underground tank through a vapor return hose. Vacuum-assist systems, which are more efficient than balance systems, use a slight vacuum to capture the vapors. They do not require a tight seal, which is often difficult to achieve because of the variety of automobile designs.

Controls on gasoline marketing operations will capture about 11 percent of the needed HC reductions in most urban areas and may capture as much as 20 percent. In addition, millions of gallons of gasoline will be saved that would otherwise evaporate.

EPA regulations or local regulations require vapor control in 13 metropolitan areas. In addition to controlling emissions, these systems will remove potentially explosive vapors and make service station areas safer.

RELATIONSHIP OF EPA's TRANSPORTATION CONTROL MEASURES TO THOSE OF OTHER FEDERAL AGENCIES[7]

In 1973 when transportation control strategies were first promulgated, EPA was the only agency requiring such plans. However, current Congressional review of the Clean Air Act is focusing on closer coordination of EPA's transportation control requirements with the legal requirements and regulations of other Federal agencies.

Department of Transportation (DOT) Transportation Improvement Program Regulation

On September 17, 1975, DOT issued the Transportation Improvement Program regulations which govern the planning and programming of all urban transportation improvements administered by both the Federal Highway Administration (FHWA) and the Urban Mass Transportation Administration (UMTA).[8]

From EPA's viewpoint the most significant aspect of the DOT regulation is the requirement for the annual preparation of a Transportation System Management (TSM) element. The TSM plan is designed to meet short-term transporation needs and thus emphasizes making efficient use of existing facilities. The emphasis on short-range measures is consistent with EPA's need to achieve the air quality standards as expeditiously as possible. TSM measures include: traffic flow improvements, preferential transit treatment, bike and pedestrian facilities, parking management, work schedule changes, pricing policies, carpooling programs, auto-free zones, park-ride bus service, express bus service, etc. The first plans are due in March 1976. In summary, TSM employs a variety of locally conceived operating, regulatory and pricing policies to bring about a more rational organization of the public transportation system and a better balanced use of the private auto.

The TSM plan is to be developed by the Metropolitan Planning Organization (MPO) in each urban area. The MPO will provide a forum for cooperative decision-making by principal elected officials of general-purpose local government.

Both UMTA and FHWA planning funds can be used for developing a TSM plan. The assistance, however, is funded out of exisiting FHWA and UMTA programs. All UMTA and FHWA funding is conditional on developing a TSM

plan. However, only UMTA funding will be conditional on reasonable implementation progress.

DOT and EPA are currently working on development of procedural guidelines to coordinate their transportation requirements. Such guidelines should result in products that better meet the objectives of both agencies. For example, DOT could receive wider agency and citizen support for TSM plans if such plans are based on a process that explicitly considers air quality objectives. EPA's regulatory authority and sanctions could better ensure that TSM measures are programmed and implemented. EPA would receive transportation improvement plans that have been locally generated and adopted by the responsible decisionmakers; in many cases these measures could replace EPA promulgations. Parallel Federal requirements could also be streamlined and made more efficient, resulting in one integrated process and product. Ideally EPA and DOT requirements should be merged.

FHWA 109(j) Consistency Determination Requirement

Section 109(j) of the 1970 Federal-Aid Highway Act directed DOT to develop and promulgate guidelines to ensure that highways constructed with Federal funds are consistent with the State Implementation Plan for achieving the air quality standards. The FHWA Regional Administrator, after consultation with the EPA Regional Administrator, is responsible for making the annual consistency determination.

The 109(j) consistency requirement serves to formally coordinate on an annual basis FHWA's highway and EPA's transportation control planning processes. Consistency determinations between proposed highway and transportation control plans are made for future years depending on the severity of the existing and future air pollution problem. Hence, a mechanism is established that explicitly links highway and air quality objectives.

Energy Policy and Conservation Act (Part C, Section 362, State Energy Conservation Plans)

This legislation, signed by the President in December 1975, means that many transportation control measures that reduce total vehicle miles traveled are now required by the Federal Energy Administration to be included in State Energy Conservation Plans if the states are to receive Federal

energy planning assistance. For example, those states choosing to develop an energy plan are required to include programs to promote carpools, vanpools, and public transportation. Furthermore, these plans may include transportation controls which are defined as "incentives, disincentives, restrictions and requirements designed to reduce the amount of energy consumed in transportation."

Clean Air Act Amendments

In at least two instances Congress has passed legislation affecting Federally promulgated transportation control measures. In 1974 a new section 110(c)(2) was added to the Act directing EPA to revoke parking surcharge regulations, delay regulations for preconstruction review of parking facilities, and conduct a study of other types of transportation control regulations. In both 1974 and 1975, EPA's appropriations act prohibited the expenditure of funds during the applicable fiscal years for administering programs to "tax, limit, or otherwise regulate parking."

The Committees of the Congress are currently considering several amendments to the Clean Air Act and are proceeding with an awareness of the recent Circuit Court Decisions. Partly as a result of these decisions, the present Senate staff version contains funding provisions and utilizes funding sanctions to ensure implementation of transportation measures. The current Act's method of requiring EPA to promulgate transportation measures for local communities where the state has failed to do so is not likely to be retained in the Clean Air Act Amendments. Rather, decisions will be left to the local communities with, hopefully, financial incentives/disincentives to spur action.

The amendment process has been slower than originally anticipated. It may well be mid-1976 or later before any law is enacted. Whatever final form the new amendments take, it is clear at least that transportation controls are becoming an important part of air quality management programs and will have an even larger role as growth becomes a more critical factor.

REFERENCES

1. South Terminal Corp. v. EPA and Pennsylvania v. EPA.

2. Brown v. EPA, 9th Circuit; Maryland v. EPA, 4th Circuit; and D.C. v. Train, D.C. Circuit.

3. Transportation Controls, Part I: "History of Transportation Control Plans," paper prepared by EPA's Office of Transportation and Land Use Policy for the Senate Committee on Public Works, January 16, 1976.

4. Ibid., Part III: "Air Quality Data."

5. Ibid., Part V: "Introduction to Individual Control Measures."

6. A Review of Control Strategies for In-Use Vehicles, prepared for EPA under contract by the Environmental Programs Group of the Aerospace Corporation, EPA-460/3-74-021, December 1974.

7. Transportation Controls, Part VII: "Relationship of Transportation Control Plans to Other Federal Programs."

8. Federal Register, Vol. 40, p. 42976, September 17, 1975.

IV. SIP PROGRESS

The SIPs continue to be amended to correct deficiencies found by the courts as well as to meet technical changes required by emerging issues. No state plan is currently fully approved although the degree to which each plan is disapproved varies from state to state. The most significant actions of the past 6 months are summarized below.

EPA-INITIATED ACTIONS

Air Quality Maintenance

On October 20, 1975, EPA proposed regulations for the analysis and development of plans for Air Quality Maintenance Areas (AQMAs).[1] These regulations specify procedures to be used for estimating future air quality concentrations and for developing new control strategies necessary to ensure the maintenance of the National Ambient Air Quality Standards (NAAQS). The substantive measures needed for this purpose are to be chosen by each state within the technical and procedural framework of these regulations. Final regulations are expected to be promulgated in May 1976.

Continuous Monitoring

On October 6, 1975, EPA promulgated regulations for the continuous monitoring of emissions from four categories of existing sources.[2] States must revise implementation plans by October 6, 1976, to include legally enforceable procedures to assure continuous monitoring of certain large fossil fuel-fired steam generators, fluid bed catalytic cracking unit catalyst regenerators, sulfuric acid plants and nitric acid plants.

All sources subject to these requirements shall have installed all the necessary equipment and shall have begun monitoring and recording data within 18 months of either approval of state plan monitoring requirements for that source or EPA promulgation of such monitoring requirements.

Preceding page blank

Non-Ferrous Smelters

In October 1975, EPA proposed final regulations for the Anaconda copper smelter in Montana[3] and for all smelters in the Phoenix-Tucson AQCR in Arizona and in the Arizona portion of the Arizona-New Mexico Southern Border AQCR.[4] Of the seven regulations proposed for copper smelters in Arizona, four allowed the facility subject to the regulation to attain ambient standards through the use of dispersion technology (i.e., tall stacks and/or supplementary control systems). These dispersion techniques are allowed as a temporary measure until technology sufficient to attain the standards becomes available. In November 1975, the Agency promulgated emission limitations for the Kennecott copper smelter near Magna, Utah.[5]

New Source Review

EPA promulgated public comment provisions in October 1975 for previously published new source review regulations concerning Arizona, California, Indiana, Michigan and Nevada.[6]

SO_2 Control Strategy-Ohio

EPA proposed a sulfur dioxide control strategy for the State of Ohio in November 1975.[7] Four public hearings have been held, and the extensive comments generated by the proposed regulations are now under review.

Public Availability of Emission Data

In November 1975, EPA published final regulations correcting 24 state plans whose confidentiality clauses had not provided for free public access to source emission data which has been correlated with air quality data.[8]

STATE-INITIATED ACTIONS

During this 6-month reporting period, a number of implementation plan actions have been initiated by the states, including the following:

- EPA has approved Indirect Source Review submissions for New York, U.S. Virgin Islands, West Virginia and Nevada (Clark County). New Hampshire has a plan submitted and under consideration for approval.
- Oregon has gained EPA approval of a plan revision correcting deficiencies in regulation of public availability of emission data.

- Montana submitted an EPA-approved SO_2 regulation for a smelting plant at East Helena.
- Idaho received partial approval of SO_2 regulations to control a zinc/lead smelter complex near Kellogg.

During the period July 1 to December 31, 1975, 34 state plan proposals and 26 approvals of state-initiated actions were published in the Federal Register. Table IV-1 gives the status of each state on three selected portions of the SIPs.

REFERENCES

1. Federal Register, Vol. 40, p. 49048, October 2, 1975.
2. Ibid., p. 46240, October 6, 1975.
3. Ibid., p. 48521, October 16, 1975.
4. Ibid., p. 49362, October 22, 1975.
5. Ibid., p. 54786, November 26, 1975.
6. Ibid., p. 50267, October 29, 1975.
7. Ibid., p. 52410, November 10, 1975.
8. Ibid., p. 55326, November 28, 1975.

Table IV-1. STATUS OF SELECTED PORTIONS OF THE STATE IMPLEMENTATION PLANS

Region/state	New source review	Transportation measures	Emission limitations
Region I			
Connecticut	Approved	Measures are required for Hartford-New Haven-Springfield AQCR and New York-New Jersey-Conn. AQCR	Approved
Maine	Approved	None required	Approved
Massachusetts	Approved	Boston transportation controls promulgated 6/12/75	Promulgation for SO_2 (12/75-sulfur content of fuel), Approved for other pollutants
New Hampshire	Approved	None required	Promulgation for TSP (11/75), approved for other pollutants
Rhode Island	Approved	Measures required; hearing 11/75	Approved
Vermont	Approved	None required	Approved
Region II			
New Jersey	Approved	Measures promulgated for Philadelphia and New York, New Jersey and Conn. AQCRs	EPA promulgation (7/73) for HC, approved for other pollutants
New York	Approved 9/15/75	TCP measures needed for New York-New Jersey-Conn. AQCR, Gennessee-Finger Lakes AQCR, and Central New York AQCR	Rulemaking for SO_2 (6/75), approved for other pollutants

Table IV-1 (continued). STATUS OF SELECTED PORTIONS OF THE STATE IMPLEMENTATION PLANS

Region/state	New source review	Transportation measures	Emission limitations
Region II cont.			
Puerto Rico	Approved	None required	Deficient in part for SO_2 (9/75), approved for other pollutants
U.S. Virgin Islands	Approved for all except public comment provisions (9/10/75)	None required	Approved
Region III			
Delaware	Approved	None required	Approved
District of Columbia	Approved	Measures promulgated for National Capital AQCR	Approved
Maryland	Approved	Measures promulgated for Baltimore and National Capital AQCRs	TSP limitations proposed (10/6/75); SO_2 regulation amended to delete reduction from 1.0 to 0.5% sulfur fuel for all AQCRs except Baltimore where the reduction is only deferred until 7/1/76 (12/5/75): approved for other pollutants
Pennsylvania	Approved	Measures promulgated for Philadelphia and Southwest Pennsylvania AQCRs	State proposals for TSP and SO_2; approved for other pollutants

Table IV-1 (continued). STATUS OF SELECTED PORTIONS OF THE STATE IMPLEMENTATION PLANS

Region/state	New source review	Transportation measures	Emission limitations
Region III cont.			
Virginia	Approved	EPA promulgation for National Capital AQCR	Approved
West Virginia	Approved (11/10/75)	None required	Approved
Region IV			
Alabama	Approved	None required	Proposal for SO_2 (9/75,1/76). promulgations for TSP (5/75, 8/75), proposal for TSP (7/75), approved for other pollutants
Florida	Approved	None required	Promulgation for SO_2 (10/75), Approved for other pollutants
Georgia	Approved	None required	Promulgation for TSP (10/75), promulgation for NO_2 (5/75), Approved for all other pollutants
Kentucky	Approved	None required	Approved
Mississippi	Approved	None required	Approved
North Carolina	Approved	None required	Approved

Table IV-1 (continued). STATUS OF SELECTED PORTIONS OF THE STATE IMPLEMENTATION PLANS

Region/state	New source review	Transportation measures	Emission limitations
Region IV cont.			
South Carolina	Approved	None required	Approved
Tennessee	Approved	None required	Approved
Region V			
Illinois	Approved	Measures promulgated for Chicago AQCR	CO strategy disapproved 6/73; approved for other pollutants
Indiana	EPA promulgations (5/73 & 2/74)	EPA promulgation (4/74) for Indianapolis AQCR	Approved
Michigan	EPA promulgation (10/72)	None required	Approved
Minnesota	Approved	Measures for Minneapolis-St. Paul AQCR	Approved
Ohio	EPA promulgation (4/74)	Measures promulgated for Cincinnati AQCR	HC strategy disapproved, SO_2 strategy proposed (11/75), approved for other pollutants
Wisconsin	Approved	None required	Approved
Region VI			
Arkansas	Approved	None required	Approved
Louisiana	Approved	None required	Approved

Table IV-1 (continued). STATUS OF SELECTED PORTIONS OF THE STATE IMPLEMENTATION PLANS

Region/state	New source review	Transportation measures	Emission limitations
Region VI cont.			
New Mexico	Approved	None required	Revocation of EPA promulgation for SO_2 proposed 11/75, approved for other pollutants
Oklahoma	Approved	None required	Approved
Texas	Approved	Measures being prepared for Austin-Waco, Corpus Christi, Houston-Galveston, Dallas, San Antonio, El Paso	EPA promulgations for HC (11/73); approved for other pollutants
Region VII			
Iowa	Approved	None required	Approved
Kansas	Approved	None required	Approved
Missouri	Approved	Measures submitted for St. Louis AQCR	Approved
Nebraska	Approved	None required	Approved
Region VIII			
Colorado	Approved	Measures promulgated for Denver AQCR	Approved
Montana	Approved	None required	Proposal for SO_2 (10/75), approved for other pollutants
North Dakota	Approved	None required	Approved

Table IV-1 (continued). STATUS OF SELECTED PORTIONS OF THE STATE IMPLEMENTATION PLANS

Region/state	New source review	Transportation measures	Emission limitations
Region VIII cont.			
South Dakota	Approved	None required	Approved
Utah	Disapproved for TSP in Wasatch Front AQCR, other sections approved	EPA promulgation for Wasatch Front AQCR (11/73)	EPA promulgations for SO_2 and TSP (10/74 and 9/74), TSP promulgation (smelter) 11/75, approved for other pollutants
Wyoming	Approved	None required	Approved
Region IX			
American Samoa	Approved	None required	Approved
Arizona	Approved, except for Pima County	Measures in effect for Phoenix-Tucson AQCR	EPA promulgations for SO_2 (3/73 and 3/74), TSP (5/73), proposal for SO_2 from smelters (10/75), approved for other pollutants.
California	EPA promulgation (4/73) for part of state	Measures promulgated for San Francisco, Los Angeles, San Diego, Fresno, and Sacramento AQCRs	EPA proposals for TSP and promulgation for HC, approved for other pollutants
Guam	Approved	None required	Approved
Hawaii	Approved	None required	Approved

Table IV-1 (continued). STATUS OF SELECTED PORTIONS OF THE STATE IMPLEMENTATION PLANS

Region/state	New source review	Transportation measures	Emission limitations
Region IX cont.			
Nevada	EPA promulgation (4/73) for Washoe County	None required	EPA promulgation for SO_2 (2/75), disapproved for TSP (no promulgation to date), approved for other pollutants
Region X			
Alaska	Approved	EPA promulgation for Northern Alaska AQCR	Revisions needed for CO, approved for other pollutants
Idaho	Approved	None required	Promulgation for SO_2 (11/75), approved for other pollutants
Oregon	Approved	None required	Approved
Washington	Approved	Promulgations for Seattle and Spokane AQCRs	Approved

V. AIR QUALITY AND EMISSION DATA

EPA bases its assessments of national air quality to a major extent on the data collected by air monitoring networks operated by state and local agencies. Before the formal status of compliance with a standard can be determined for an Air Quality Control Region (AQCR), a reasonable history of data (at least one year) must be compiled from a representative network of monitors. A single station reporting a second high value over the short-term standard is sufficient to document a violation of that standard; similarly, a single station reporting an annual average of values that exceeds the annual standard is enough to document a violation of that standard. Compliance must usually be demonstrated by more extensive evidence from a multi-station network. The target date for completing these networks was, in most cases, July 1974. Table V-1 summarizes the progress made by the states through 1974 in completing the networks proposed in their SIPs. The number of AQCRs reporting second high values that violate the standards is summarized in Table V-2. (This number of AQCRs reporting violations is different from the number of AQCRs listed in the previous report[1] as being unlikely to attain standards by the statutory date because that assessment was based on a number of factors, only one of which was air quality data.)

AMBIENT AIR QUALITY DATA

The status of air quality in the United States in 1974 was in many respects similar to that reported for 1973. Approximately the same percentage of reporting stations are still exceeding air quality standards, with one exception: an apparent decline in the proportion of stations exceeding the 8-hour carbon monoxide standard.

Table V-1. NATIONAL SUMMARY OF AIR MONITORING STATIONS REPORTING 1974 DATA TO THE NATIONAL AEROMETRIC DATA BANK BY SEPTEMBER 1975

Air monitoring stations	TSP	SO_2	CO	O_x
No. proposed for 1974[a]	3,510	2,132	457	458
No. reporting minimum data[b]	3,788	2,241	377	343
No. reporting valid annual data[c]	2,004	1,030	-	-

[a]Number of stations proposed by states in their SIPs to be operating in 1974.

[b]At least three 24-hour values for intermittent monitors or 400 hourly values for continuous monitors.

[c]Four consecutive quarters (a calendar year) of statistically valid data. There are no annual standards for CO and O_x, so no annual averages are calculated.

Table V-2. NATIONAL SUMMARY OF AQCRs REPORTING VIOLATIONS OF NAAQS TO THE NATIONAL AEROMETRIC DATA BANK FOR 1974

Air Quality Control Regions (AQCRs)[a]	TSP	SO_2	CO	O_x
No. reporting minimal data[b]	236	210	92	86
No. exceeding 24-hour primary standard[c]	99	22	--	--
No. exceeding annual primary standard[c]	111	11	--	--
No. exceeding 1-hour standard[c]	--	--	13	76
No. exceeding 8-hour standard[c]	--	--	58	--

[a]Total number of AQCRs = 247.

[b]At least three 24-hour values for intermittent monitors or 400 hourly values for continuous monitors.

[c]An AQCR must have all reported stations showing no violations to be considered an "attainment AQCR." If a single station in an AQCR reports a violation, the entire AQCR is considered a "non-attainment AQCR."

All 247 AQCRs are required to be reporting at least one monitoring station for total suspended particulate (TSP). Of these, 198 AQCRs had at least one sampler station reporting enough data to compute a yearly average (four consecutive quarters of statistically valid data) for the primary annual TSP standard. Of the 2004 monitoring stations reporting a valid year's data, 1537 (77 percent) reported values achieving the annual standard. The 460 stations that had readings exceeding the standard were located in 111 of the 198 AQCRs reporting data sufficient to compute a yearly average.

All but 11 AQCRs reported minimal* data for the primary 24-hour TSP standard. Of the 3788 monitoring stations in these 236 AQCRs, 3462 (90 percent) reported values achieving the standard. The 326 stations that had readings exceeding the standard were located in 99 of the 236 AQCRs submitting minimal data.

As with particulates, all 247 AQCRs are required to be operating at least one sulfur dioxide (SO_2) monitoring station. Of these, 155 AQCRs reported a valid year's data for at least one station. Of the 1030 monitoring stations reporting a valid year's data, 999 (97 percent) reported values achieving the primary annual SO_2 standard. The 31 stations that reported values exceeding the standard were located in 11 of the 155 AQCRs submitting data sufficient to compute a yearly average.

All but 37 AQCRs reported minimal data for the primary 24-hour SO_2 standard. Of the 2241 reporting stations in these 210 AQCRs, 2142 (over 95 percent) reported values achieving the standard. The 99 stations that had readings exceeding the standard were located in 22 of the 210 AQCRs submitting data.

Carbon monoxide (CO) data were reported from 377 stations in 92 AQCRs (30 AQCRs are required to have CO monitors). The 1-hour CO standard was achieved by 350 stations (93 percent) in 13 AQCRs; the 8-hour CO standard was achieved by 166 stations (44 percent in 58 AQCRs.

Oxidant/ozone (O_x/Oz) data were reported from 343 stations in 86 AQCRs (55 AQCRs are required to have O_x/Oz monitors). The 1-hour standard was achieved by 70 of those stations (20 percent) representing 76 AQCRs.

---

*Minimal data are defined for all pollutants as at least three 24-hour samples from a hi-vol or a bubbler; or 400 hourly values from a continuous monitor.

Nitrogen dioxide (NO_2) measurement methods have been reviewed and the continuous chemiluminescent measurement principle has been proposed as the Federal reference method. Valid annual data for NO_2 were reported from 582 stations using methods that are deemed candidates for the status of reference or equivalent methods. These 582 stations are located in 101 AQCRs. Only 18 stations in four AQCRs exceeded the annual standard for NO_2.

TRENDS IN AIR QUALITY, 1970-1974

Historical trends in air quality levels suggest the rate and extent of progress in the control of air pollution. For some pollutants, lack of historical data on a national basis limits the inferences that may be made. However, the recent expansion of air pollution monitoring networks is providing data that will serve as a baseline for future trend assessment. Currently, a sufficient historical data base on the national level is available for total suspended particulate and sulfur dioxide primarily in urbanized areas. For oxidants, carbon monoxide, and nitrogen dioxide, historical data are limited and the geographical distribution is very sparse. Therefore, trends for these three pollutants are considered as a series of special cases. The present status of historical air quality data reflects the evolution of air pollution monitoring efforts, which initially were concentrated on the assessment of total suspended particulate and sulfur dioxide in center city areas

Based on composite averages from 1096 sites, TSP levels have decreased from 1970 to 1974. During this period, the composite annual average declined from 80 to 66 $\mu g/m^3$. This is an overall decrease of 17 percent, or slightly less than 5 percent per year. This improvement was generally reflected throughout the nation but specific localities are still experiencing TSP levels in excess of the National Ambient Air Quality Standards. The principal control problems are fugitive emissions and urban background (secondary particulates, fugitive dust, and transportation-related emissions). During this period, the estimated reduction in particulate emissions was 29 percent.

Sulfur dioxide levels have declined from an annual composite average of 38 $\mu g/m^3$ in 1970 to 26 $\mu g/m^3$ in 1974. These averages are based on data from 258 sites and represent an overall decrease of 32 percent, or

approximately 9 percent per year. However, over 90 percent of these sites are located in urbanized areas and caution must be used in generalizing these results. During this period, the decrease in estimated emissions was 8 percent. The much greater reduction in ambient SO_2 levels may reflect the shift in SO_2 emissions away from center city areas. Thus, the overall decline in SO_2 levels may be the combined result of emission reductions and redistribution of emission patterns. The principal remaining control problems are major sources such as power plants and smelters. Data for 1975 are expected to show some additional decline in SO_2 in response to the mid-1975 compliance deadline.

Carbon monoxide trends in the few cities having historical data suggest general improvement. This is consistent with the automobile emission reductions during the same period. Data from the States of California, New Jersey, New York, and Washington show reductions in the percent of time the 8-hour CO standard is exceeded. The peak hourly values have been relatively stable, but in the majority of urban areas the 8-hour standard is the more serious problem and this is where improvement is being shown. Los Angeles and New Jersey monitoring data indicate that the percent of time the 8-hour CO standard was exceeded was reduced by approximately 50 percent from 1970-1971 to 1973-1974 (roughly 12 percent to 6 percent). The State of Washington showed consistent progress during the 1971-1973 period, and New York State and San Francisco data showed that less than 0.5 percent of the 8-hour values were above the standard. On a national basis, the number of CO monitoring sites increased consistently during 1970-1974 from 73 to 377, more than a 500 percent increase. The increase from 1973 to 1974 was 25 percent (299 to 377 sites).

Oxidant trends in California continue to show long-term improvement. Data in the Los Angeles and San Francisco areas show 20 to 50 percent decreases in the number of times the 1-hour oxidant standard was exceeded. However, an important characteristic of the oxidant problem is the recognition of the wide spatial distribution of high oxidant levels. Recent studies have focused attention on oxidants as an area-wide phenomenon extending even to rural areas. The number of oxidant or ozone monitors has increased nationally by more than 600 percent between 1970 and 1974 (51 to 343), with a 30 percent increase in 1974 over 1973 (265 to 343).

As these sites continue to report data, it will become possible to examine oxidant trends on a much broader geographical basis.

Measurements of oxidants at rural stations from Ohio into Maryland and Pennsylvania through the summer of 1974 have confirmed earlier reports of high oxidant concentrations remote from urban areas. The history of air masses, plus the presence of distinctive man-made pollutants in the air masses, strongly suggests that the observed oxidant concentrations are the product of man-made emissions received by the air masses in passing over an urban area. These ingredients continue to react, forming photochemical oxidants, as the air masses move across the countryside.

Nitrogen oxide emissions have increased nationally since 1970 and upward trends in NO_2 have been seen in Los Angeles and Philadelphia. Because of recent changes in measurement methodology for monitoring nitrogen dioxide, very few areas have sufficient historical data to assess NO_2 trends during the 1970-1974 period. However, between 1973 and 1974, the number of stations reporting a complete year of acceptable NO_2 data increased by almost 800 percent so that future reports should be able to more accurately assess national trends in NO_2 levels.

Nationwide estimates of pollutant emissions from 1970 through 1974 show steady declines in the tonnages of particulates and carbon monoxide being emitted into the air. Emissions of sulfur oxides and hydrocarbons evidence only slight declines. Nitrogen oxides show a slight increase in total emissions.

DATA REPORTING

Although data reporting is improving, some difficulties persist in acquiring or reporting a full year's data for many monitoring stations. This situation continues to handicap the evaluation of the nation's air quality. From a preceding section it can be observed that of the 3788 TSP monitoring stations and 2241 SO_2 monitoring stations reporting minimal data in 1974, only 53 percent and 46 percent, respectively, reported data sufficiently complete to permit calculating a valid annual mean. This not only means that the annual standards for these pollutants can only be evaluated at about half the existing stations, but also that the incidence of 24-hour standard violations is inconclusive wherever the

data record is incomplete. Thus, expediting the flow of data from the state and local monitoring agencies to EPA's national data bank is being given increased emphasis.

AIR POLLUTION EPISODES

Within this last report period, EPA has established a standardized reporting system for air pollution episodes. Table V-3 presents by EPA region the number and type of episodes that occurred August through December 1975. These data may be summarized as follows:

- High ozone/oxidant levels were responsible for 111 of the 136 episodes. The greatest frequency and highest stage ozone/oxidant episodes occurred in the Los Angeles Basin. The national frequency of ozone/oxidant episodes dropped sharply during the 5-month period, reflecting the seasonal decrease in photochemical activity.
- The national frequency of TSP episodes increased during the period August - December, reflecting the seasonal increase in periods of air stagnation. The highest frequency of TSP episodes occurred in a four-county area in Eastern Ohio.
- The most severe episode was the Emergency Stage episode for TSP in Alleghany County, Pennsylvania, during November.
- Carbon monoxide episodes occurred during November and December only, and were most frequent in Fairbanks, Alaska.
- Sulfur dioxide episodes were confined to two counties in Arizona and did not exceed Alert Stage levels. These were associated with emissions from non-ferrous smelters.
- With minor exceptions, each episode area had only one pollutant responsible for all its episodes.

REFERENCES

1. State Air Pollution Implementation Plan Progress Report, January 1 to June 30, 1975. EPA-450/2-75-008. September 1975.

Table V-3. AIR POLLUTION EPISODES FOR AUGUST THROUGH DECEMBER 1975[a]

Area	Pollutant	Number of episodes[a]					
		Aug.	Sept.	Oct.	Nov.	Dec.	Total
Region I							
Massachusetts							
Massachusetts, S.E. portion	O_x	1	0	0	0	0	1
Region II							
None recorded for any pollutant		0	0	0	0	0	0
Region III							
Pennsylvania							
S. Alleghany County	TSP	0	0	0	0	1[b]	1
Region IV							
Alabama							
Jefferson County	TSP	0	0	1	1	1	3
Kentucky							
Louisville	O_x	0	1	0	0	0	1
Newport	O_x	0	1	0	0	0	1
Tennessee							
Chattanooga	TSP	0	0	0	1	0	1
Region V							
Indiana							
Floyd, Clark, and Dearborn Counties	O_x	0	1	0	0	0	1
Michigan							
Michigan, lower portion	O_x	1	0	0	0	0	1
Ohio							
Ohio, most of state	O_x	1	0	0	0	0	1
Hamilton and Clermont Co's.	O_x	0	1	0	0	0	1
Ohio, most of state	TSP	1[c]	0	0	0	0	1
Beltmont, Coumbiana, Jefferson, and Monroe Co's.	TSP	0	0	4	1[c]	1	6
Lawrence County	TSP	0	0	0	1[c]	0	1
Jefferson County	TSP	0	0	0	1	0	1
Wisconsin							
Wisconsin, S.E. district and Milwaukee County	O_x	1	1	0	0	0	2
Wisconsin, southern third of state	O_x	1	0	0	0	0	1
Racine County	O_x	1	0	0	0	0	1
Ozaukee County	O_x	1	0	0	0	0	1

Table V-3 (continued). AIR POLLUTION EPISODES FOR AUGUST THROUGH DECEMBER 1975[a]

Area	Pollutant	Number of episodes[a]					
		Aug.	Sept.	Oct.	Nov.	Dec.	Total
Region VI							
None recorded for any pollutant		0	0	0	0	0	0
Region VII							
None recorded for any pollutant		0	0	0	0	0	0
Region VIII							
None recorded for any pollutant		0	0	0	0	0	0
Region IX							
California							
Los Angeles Co.	O_x	18	11	6[c]	1	0	36
Orange Co.	O_x	1	6	1	1	0	9
Western San Bernardino County	O_x	16[c]	17	6	0	0	39
Western Riverside Co.	O_x	6	4	1	0	0	11
Kern County	O_x	1	0	0	0	0	1
Ventura County	O_x	1	0	0	0	0	1
San Francisco Bay Area	O_x	0	1	0	0	0	1
Santa Barbara	O_x	0	1	0	0	0	1
Los Angeles Co.	CO	0	0	0	0	1	1
Lennox	CO	0	0	0	1	0	1
Arizona							
Hayden	SO_2	0	0	1	0	0	1
Miami	SO_2	0	0	1	0	0	1
Phoenix	CO	0	0	0	1	0	1
Region X							
Alaska							
Fairbanks	CO	0	0	0	1	3	4
Idaho							
Boise	CO	0	0	0	0	1	1
Washington							
Spokane	CO	0	0	0	0	1	1

[a]Criteria for episodes include three main stages that are increasingly hazardous: alert, warning, and emergency. Concentrations at which each stage is attained for each pollutant are specified in Appendix L of 40 CFR 51. If not otherwise indicated, episodes are for the alert stage.

[b]Emergency stage episodes.

[c]Warning stage episodes.

Source: EPA National Air Data Branch, Research Triangle Park, N. C.

VI. STATIONARY SOURCE COMPLIANCE

OVERVIEW

The Clean Air Act establishes a stringent timetable for EPA and states to abate air pollution. With a few notable exceptions (e.g., sulfur oxide emission limitations for the States of Ohio, Indiana, and Illinois), all states now have fully enforceable emission limitations at levels protective of health and welfare for stationary installations, which are the source of the large majority of all particulate and sulfur oxide emissions. The Act provides 3 years from the date of state plan approval for EPA and states to enforce SIP emission limitations and achieve health-related air quality standards. Except for portions of 16 states, where an extension of up to 2 years has been granted for one or more pollutants, these ambient air quality standards were required to be met by May 31, 1975.

To reach the target air quality levels, state, local and Federal enforcement programs have the responsibility for ensuring that stationary sources attain and maintain compliance with emission limitations established by SIPs. Enforcement responsibilities for state-developed, EPA-approved emission limitations are shared by EPA and the states. The Clean Air Act recognizes that states have primary responsibility for achieving clean air within their jurisdictions. When states do not enforce air pollution standards, however, the Act requires EPA to take action. In accordance with the intent of the Act, the EPA air enforcement program is designed to ensure that all sources achieve compliance with applicable standards. EPA bolsters state air enforcement efforts by supporting state control agencies through control agency grants, providing specialized skill and expertise or special contractual efforts, and by taking enforcement actions against selected sources when the states cannot or will not enforce.

Enforcement of standards at stationary sources is an immense task since it is estimated that over 200,000 stationary sources are now subject to SIP emission limitations. Of this number, however, nearly 22,000 are major emitters (facilities individually capable of emitting over 100 tons of a pollutant each year). As a class, these sources produce about 85 percent of all air pollution from stationary sources. Therefore, enforcement programs have first focused on ensuring compliance by such emitters in order to have the greatest impact on reducing emissions in the least amount of time. Concentrated efforts expended in this area have resulted in a highly successful program. As shown in Table VI-1, by December 1975 EPA and states had identified 21,670 such major sources and had brought 18,327 (85 percent) of them into final compliance or placed them on firm schedules leading to compliance in the very near future (16,969 in final compliance and 1,358 complying with schedules). Compliance levels are expected to climb to about 90 percent by the end of FY 1976. In the past 6 months, EPA initiated nearly 400 enforcement actions and conducted some 4,500 field inspections in accomplishing this goal. At the same time, states undertook a large part of the compliance program by conducting around 95,600 field investigations and initiating about 12,000 enforcement actions to bring major sources into compliance with SIP emission limitations. These actions, and those of the past several years, have resulted in substantial achievements in reducing emissions of TSP and SO_x pollutants to the atmosphere. A recent study shows that since enactment of the amendments to the Clean Air Act in 1970, industry compliance with Federal, state, and local air pollution laws had, by 1974, kept over 26 million tons of particulate matter and 7.6 million tons of SO_x out of the nation's air.[1] These reductions in emissions from stationary sources represent achievement of about three-quarters of the reduction goals needed for full SIP compliance for particulates and about half of the goal for SO_2.

However, 2,464 or 11 percent of major sources still violate emission standards or compliance schedules, and nearly 900 must now be inspected to determine their compliance status. These last violators are expected to be the most difficult sources to bring into compliance because they are for the most part such large sources as power plants and steel mills that have to date demonstrated a great reluctance to make necessary commitments

Table VI-1. COMPLIANCE STATUS OF MAJOR EMITTERS BY REGION
DECEMBER 31, 1975

EPA Region	Total point sources identified	Compliance status		
		Sources complying with standards or schedules	Sources violating standards or schedules	Sources of unknown compliance status
I	1240	946	244	50
II	1791	1472	214	105
III	2921	2436	430	55
IV	4718	4270	391	57
V	3758	2827	708	223
VI	1755	1339	181	235
VII	1716	1589	60	67
VIII	644	561	78	5
IX	2348	2187	104	57
X	779	700	54	25
Total	21,670	18,327	2,464	879

to curb emissions to the atmosphere. Thus, despite decided progress in SIP enforcement, state and Federal tasks with respect to compliance by large sources are not yet complete.

Most of the remaining major violators and most of the major sources of unknown status are located in Air Quality Control Regions (AQCRs) that are not expected to attain the primary NAAQS for TSP and/or SO_2 in a timely way. Therefore, enforcement against such sources is now of paramount importance. In addition, it is estimated that about 130,000 smaller emitters (each having potential emissions of between 10 and 100 tons per year) are located in these areas where standards are not expected to be met. States and EPA are now conducting extensive analyses to determine the reasons for poor air quality in each of the non-attainment areas in the country. These analyses will for the most part be complete by July 1976, and will specifically identify in each AQCR those major and minor sources that are contributing to non-attainment problems. Preliminary analysis indicates that the minor sources making the largest contribution to air quality problems include such stationary sources as small industrial, commercial, and residential boilers; small incinerators, such as apartment house incinerators; dry cleaning operations; bulk storage tanks; cement handling equipment; cotton gins; feed and grain mills; and chemical plants. As the causes of non-attainment are identified in these complex analyses, and as the problem categories of sources are pinpointed, strategies will be worked out for each area to bring violating sources into compliance and therefore improve air quality in deficient areas of the country.

MAJOR SOURCE CATEGORIES

Several categories of major sources are still posing substantial problems across the nation in not achieving compliance with emission standards within the time limits prescribed by the Clean Air Act. Notable among these sources are coal-fired power plants, integrated iron and steel manufacturing plants and coking facilities, and primary smelters. EPA has set up special efforts to achieve compliance by these sources and continues to pressure owners and operators of these sources to bring their plants into compliance with emission limitations.

In general, these three source categories have the most difficult air compliance problems because of the amount of control required and the associated costs of the control techniques that need to be applied. For coal-fired power plants, control of sulfur dioxide emissions is the major concern. Flue gas desulfurization systems (scrubbers) and low-sulfur fuels are two major approaches to the reduction of power plant emissions. On the other hand, control of fugitive particulate emissions is the most difficult problem for iron and steel mills and coke plants. This problem is underscored by the large degree of noncompliance at coking facilities. For primary copper, lead, and zinc smelters, control of sulfur dioxide emissions is a major difficulty; plants producing sulfuric acid are commonly required to remove the sulfur dioxide from stack gases. These industries accounted for about one-third of the total emissions of particulates and about two-thirds of the total emissions of sulfur dioxide in 1974. For this reason, compliance by all of these sources is crucial to the attainment of the NAAQS in many AQCRs.

Coal-Fired Power Plants

Control of emissions from power plants is essential to the attainment of the health-related air quality standards for sulfur oxides in many areas of the nation. As a class, coal-fired steam electric plants emit about 60 percent of the total SO_x produced by all sources. During the summer of 1973, it became increasingly apparent to EPA that progress to meet applicable state SO_x emission limitations by this sector of industry was lagging severely. New supplies of low-sulfur coal, the favored approach to reducing sulfur oxide emissions, were becoming increasingly scarce, and utilities were extremely reluctant to use flue gas desulfurization systems (scrubbers) to remove SO_x from the stack after burning high-sulfur coal.

National public hearings were held in the fall of 1973 to determine the validity of the utilities' contentions regarding optional means of compliance. After hearing testimony from a variety of expert witnesses and other interested parties, the 1973 Hearing Panel concluded that the basic technological problems associated with flue gas desulfurization (FGD) had been solved or were within the scope of current engineering and, further, that FGD could be applied at reasonable cost. A special EPA enforcement program was then initiated for power plants on the basis of these findings.

At that time it was estimated that approximately 50 percent of some 394 coal-fired power plants in the nation were violating applicable SIP emission limitations. Significant progress has been made in improving compliance levels since these hearings. Of the total 394 coal-fired power plants in the country, 261 plants now comply with final emission limitations or abatement schedules, up from an estimated 200 in the fall of 1973. Forty-seven of the total U.S. plants are located in Ohio where no SO_x plan is now in effect. In November 1975, EPA proposed emission limitations for SO_x applicable to power plants, and these regulations are expected to be promulgated in mid-1976. Another 29 of these plants are located in Indiana where the State Circuit Court recently vacated the SO_x plan. The State of Indiana is currently appealing this decision, but EPA may yet have to promulgate a new SIP requirement to cover these plants. An additional 26 of the total 394 plants are in Illinois, where the SO_x plan was also vacated recently. EPA and Illinois are now gathering data in support of a new plan for SO_x. The remaining 31 plants are known to be out of compliance and action is being taken where possible. SIP revisions are underway for seven of these plants; standards for six plants are being challenged under section 307 of the Act; a legal stay to enforcement is in effect for one plant pending outcome of litigation; ten of these plants are part of the TVA system, with which EPA is currently negotiating for a consent agreement; three plants are subject to conversion orders by the Federal Energy Administration and will require compliance date extensions; notices of violation have been issued to two plants; one utility company is in the process of negotiating a consent agreement with EPA; and action is now being planned for the final remaining source. The primary compliance problems remaining with power plants center on resolving the regulatory problems in Indiana, Illinois, and Ohio.

Another measure of EPA's effectiveness in cleaning up SO_x emissions from power plants is the increased commitment to FGD systems since the 1973 public hearings. At that time, some 44 units were installed, under construction, or planned around the country, and by December 1975, this figure had more than doubled to a total of 115 plants, 28 of which are operational, 18 of which are under construction, and 69 of which are in some stages of planning. These units total nearly 45,000 megawatts of generating capacity, about half the estimated need to achieve 100 percent compliance with SO_x

regulations by 1980. The number of units now on line has nearly tripled, from 10 to 28, and the bulk of these 115 units will have started up before 1980. Some are scheduled for startup beyond 1980 and others have unknown dates because their installations must await the startup dates of new plants.

Primary Non-Ferrous Smelters

Though small in number, the nation's 25 non-ferrous smelters account for about 10 percent of the total sulfur oxides emitted by stationary sources. Most of the Agency's problems in assuring compliance by non-ferrous smelters have centered in the western U.S., where six State Implementation Plans for sulfur dioxide affecting 13 smelters were disapproved in 1972 as inadequate to meet the NAAQS unless the smelters were controlled. Another smelter was affected when EPA disapproved the entire Ohio SIP for SO_2 in April 1974. Regulations have been promulgated for four of these smelters and proposed for the remaining ten. These regulations require application of reasonably available retrofit control technology and, if necessary, allow the interim use of supplementary control systems (SCS) and tall stacks until adequate constant emission control techniques become reasonably available. Each smelter using SCS is further required to conduct a research and development program to hasten the development of such technology. One regulation that EPA recently promulgated was upheld by the Ninth Circuit Court of Appeals, but this case has been appealed to the Supreme Court. Two other challenges under section 307 of the Clean Air Act are still outstanding. All five smelters in the eastern U.S. are now in compliance with applicable regulations or are on appropriate schedules. In one case, EPA issued an administrative order to enforce the regulations; in another, EPA issued a finding of violation. Generally, however, state agencies are responding adequately to the situation and Federal action is not required.

About half of the primary non-ferrous smelters are located in AQCRs where statutory attainment dates have been extended to July 1977. No major obstacles are anticipated that might prevent achievement of primary ambient standards in the vicinity of these sources by the mid-1977 deadlines by using SCS; however, installation of some constant control devices may not be completed before the attainment date. Those subject to mid-1975 deadlines are, for the most part, nearing compliance.

Iron and Steel Mills/Coke Plants

The iron and steel industry presents one of the most difficult compliance problems for state and Federal air pollution enforcement programs. There are 246 steel and coke making installations in the United States, of which 218 produce iron and steel (and may or may not produce coke), while the remainder produce solely coke to be used in metallurgical and other industries. Nearly all of these installations are located in areas where the health-related ambient air quality standards are not expected to be attained.

Within steel facilities are a number of basic processes, each of which presents tough technical problems to control. The processes that are the greatest sources of air pollution in the industry are by-product coke batteries, blast furnaces, sintering lines, open hearth furnaces, basic oxygen furnaces, and electric arc furnaces. There are nearly 1,200 of these major emitting steel processes; they characterize the basic means of producing iron and steel and are the subject of intensifying EPA and state enforcement attention. As indicated in Table VI-2, the steel industry lags far behind other stationary sources in complying with SIP requirements; 50 percent (589) of the industry's 1,178 major polluting processes have yet to comply with SIP emission limitations while the level of noncompliance for all major stationary source installations stands at 11 percent.

To date state, local, and EPA enforcement programs have placed 367 of the 589 violating steel processes on schedules to achieve final compliance. As of December 31, 1975, EPA had initiated 79 enforcement actions (43 notices of violation and 36 enforcement orders or referrals to the Department of Justice for prosecution) at nearly 50 steel installations. Reflecting the increased emphasis EPA has given steel industry compliance, 46 of these actions were taken in 1975, compared to 25 such actions in 1974 and 8 in 1973.

While the reasons for continued violations by any of the major polluting steel processes are complex and related to unique conditions at each facility, the steel industry has regularly raised a number of issues to argue for more time or for relaxation of air pollution control requirements. A summary of these issues and EPA's position is outlined below:

Table VI-2. STATUS OF COMPLIANCE WITH EMISSION LIMITATIONS
MAJOR POLLUTING STEEL PROCESSES VS ALL MAJOR STATIONARY SOURCE INSTALLATIONS
FEBRUARY 1976

Major steel processes	Total number	Status of compliance with SIP emission limits		
		In compliance	In violation	Unknown status
Coke batteries	252	22	209	21
Sinter lines	71	13	45	13
Blast furnaces	190	110	63	17
Open hearth furnaces	211	39	107	65
Basic oxygen furnaces	92	20	54	18
Electric arc furnaces	362	173	111	78
Totals	1,178	377 (32%)	589 (50%)	212 (18%)
All major stationary source installations[a]	21,670	18,327 (85%)	2,464 (11%)	879 (4%)

[a]This comparison shows the compliance status of the steel industry in the most favorable light, since the compliance status of individual processes within steel facilities is being compared to the status of total installations with major potential air pollution problems (the source of the stationary source compliance figures is the EPA formal reporting system; under this system a facility having several processes, only one of which is in violation or of unknown status, must be classified as in violation or unknown as a whole).

1. Impact of fugitive process emissions -- Fugitive process emissions are pollutants that are formed during industrial processes and escape to the air without having been ducted to a smoke stack; characteristically, fugitive process emissions are emitted from parts of the steel making operations that are difficult to seal or enclose. The heart of the steel industry's complaints about abating air pollution is their contention that fugitive process emissions are either harmless or inconsequential. Over the past year, however, EPA and state efforts have documented that fugitive particulate emissions are large in terms of mass and that fugitive particulate emissions have a large impact on ambient air quality.

2. Conflicts with proposed OSHA requirements -- In June 1975, the Coke Oven Standards Advisory Committee (composed of representatives of the steel companies and unions) within the Occupational Safety and Health Administration (OSHA) made a number of recommendations to the Department of Labor regarding new occupational safety standards for coke oven workers. One of these, Resolution #7, called for a complete ban on the construction of coke oven sheds (one method of collecting a portion of coke oven fugitive emissions by enclosing part of the battery with a shed-like structure). EPA testified to the committee that the NIOSH (National Institute of Occupational Safety and Health) test data used to support Resolution #7 was improperly construed and that it in fact showed that the addition of a coke oven shed caused no statistically significant increase in worker exposure to air pollutants. Data from EPA tests of coke oven sheds also support this position. After reviewing the record of the committee, the Department of Labor agreed with EPA's position and proposed regulations on July 31, 1975, stating that ". . . it is OSHA's opinion that the application of well designed emission control technology will not necessarily preclude the attainment of the level of worker health protection provided by this proposal."[2]

3. Economic problems -- In general, the steel industry has made a variety of arguments that the costs of controlling air pollution (especially fugitive emissions) far exceed any benefits. Nearly all U.S. steel mills were established prior to World War II and many continue to operate older, less profitable equipment. Profits for the steel industry are consequently among the lowest for principal U.S. manufacturing industries (typically 5 to 10 percent of net worth). Much of the problem in air pollution control

at existing steel installations, therefore, centers on controlling fugitive air pollutants from equipment, such as coke ovens, designed prior to the emergence of widespread concern for air quality.

The industry's complaints about costs were summarized in a report prepared for the American Iron and Steel Institute which concluded that about twice as much money would be needed to comply with clean air requirements as had been previously estimated.[3] EPA has reviewed its cost studies and has concluded that the industry's cost figures are much too high. The complexity of the industry makes estimates difficult, but a comparison of industry and EPA abatement cost estimates (in billions of dollars through 1983) is summarized below:

COSTS FOR ABATING:	EPA	INDUSTRY
Stack emissions	$2.66	$3.18
Fugitive emissions	1.61	3.70
Total air pollution abatement costs	$4.27	$6.88

4. Energy issues -- The steel industry contends that the large amounts of energy needed to abate air pollution conflict with national energy policy. The American Iron and Steel Institute has argued this issue in eight case studies prepared for the Federal Energy Administration and in the study it commissioned Arthur D. Little to conduct. For each case EPA has shown that the industry's estimates of energy needs are greatly exaggerated because they are based on application of the most energy-intensive control techniques and do not consider the recycling of energy now wasted in heat and combustible gases.

REFERENCES

1. Particulate and Sulfur Oxide Reduction Achieved Nationwide for Selected Industrial Source Categories, 1970-1974. EPA-340/1-76-001. February 1976.

2. Federal Register, Vol. 40, p. 32273, July 31, 1975.

3. Steel and the Environment: A Cost Impact Analysis, report prepared by the Arthur D. Little Company for the American Iron and Steel Institute, May 1975.

VII. CONTROL AGENCY RESOURCES

SUMMARY OF RESOURCES

The total funds (state and Federal) available for air pollution control in agencies supported by Federal grants or receiving special assistance in the form of contractor work were approximately $143 million in FY 1975. In addition, approximately $7 million of non-Federally supported activities were carried on at the local and state levels of government, for a total of $150 million.

Since FY 73 Federal support of control agencies has remained relatively constant at approximately $51.5 million each year. In FY 75 this amount increased slightly to $52.7 million, and in FY 76 Federal funds available for support of state and local air pollution control agencies will approximate $55.2 million. The contribution of non-Federal funds by state and local agencies approximated $91 million in FY 75 for those agencies receiving Federal support, and totaled $98 million when other agencies, such as local health departments with air pollution control funds, are included.

Preliminary estimates indicate that approximately 6700 man-years of effort (directly related to SIP activities assisted by Federal support) were devoted to controlling air pollution at the state and local level in 1975. It is estimated that all air pollution control activities approximated 7100 man-years in 1975 when other agencies are included.

PROGRESS OF STATE AND LOCAL AIR POLLUTION CONTROL PROGRAMS

Figures VII-1 and VII-2 show in terms of both dollars and manpower the historical growth of the nation's capability to control air pollution. The total expenditures for the support of air pollution control programs have grown at an average annual rate of approximately 28 percent, from

Preceding page blank

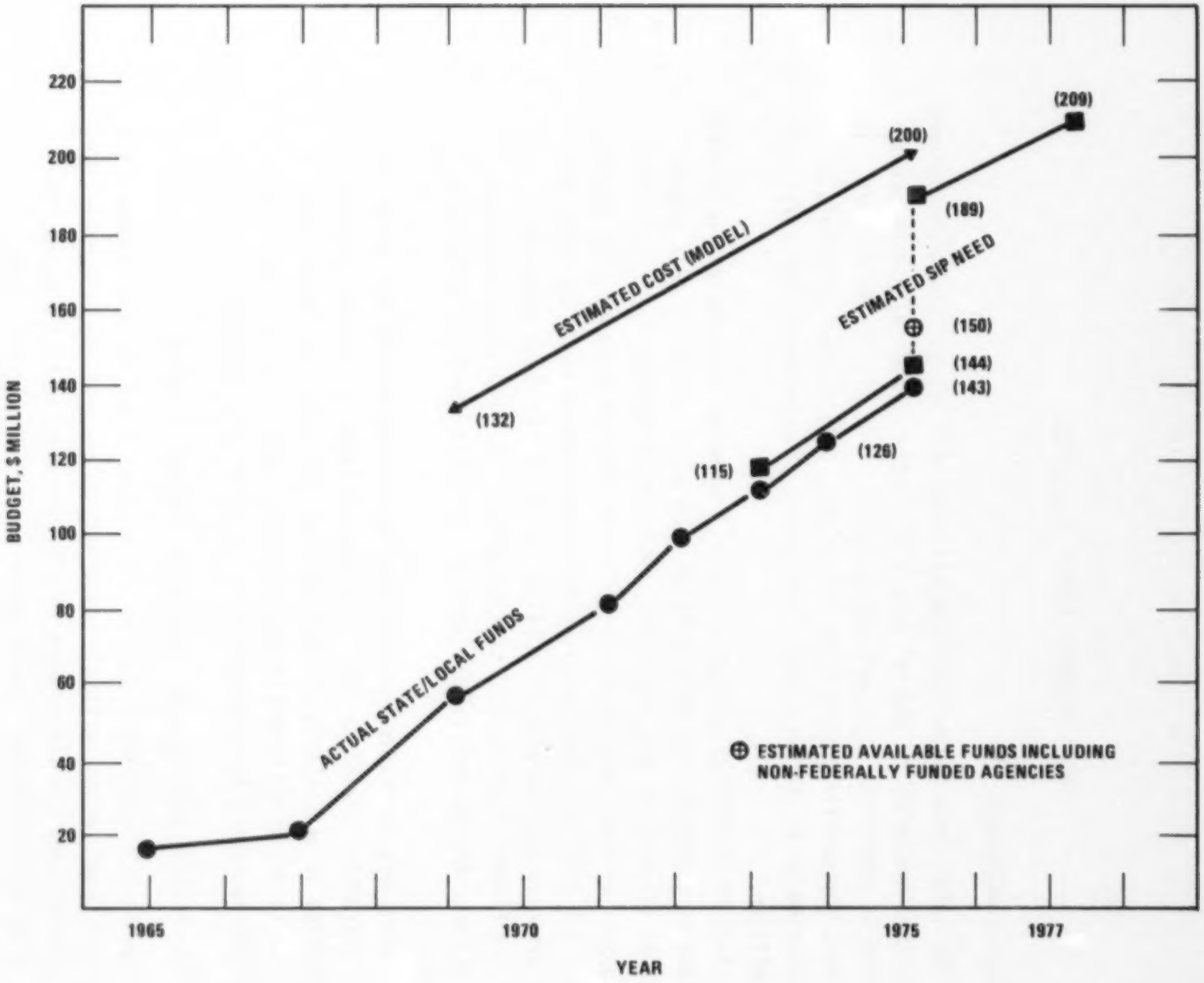

Figure VII-1. State and local air pollution control agency funds - actual vs need.

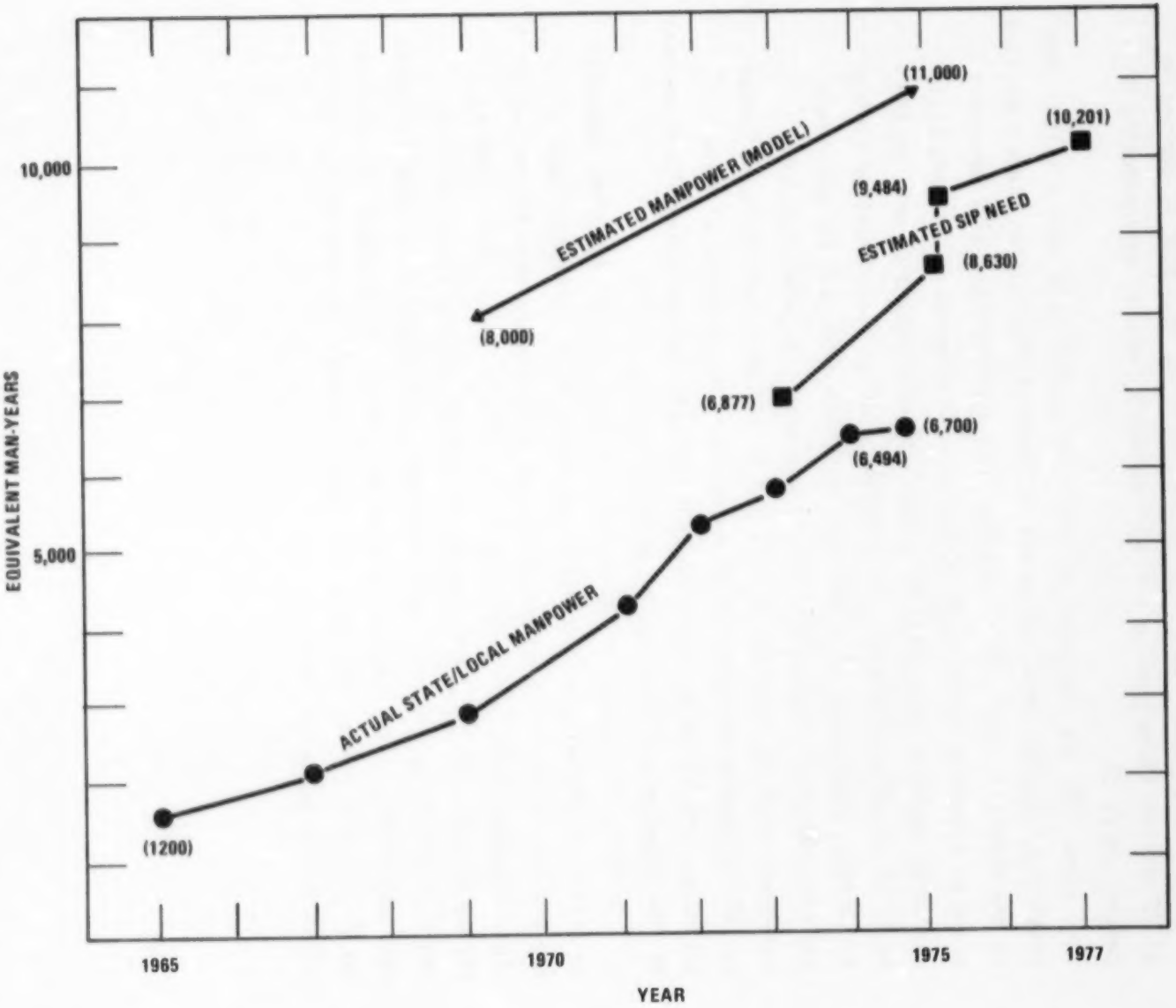

Figure VII-2. State and local air pollution control agency manpower - actual vs need.

$13.8 million in FY 65 to approximately $150 million in FY 75. The percentage of these expenditures provided by Federal financial assistance has increased from approximately 31 percent in FY 65 to a peak 43 percent in FY 72 and has since been on a slight downward trend to approximately 36 percent in FY 75.

Since 1965 the man-years of effort in control work have tripled. Manpower requirements contained in the 55 State Implementation Plans submitted by the states in April 1971 indicated that approximately 8500 man-years would be necessary to implement Clean Air Act programs. However, state and local agencies have provided some additional estimates made on the basis of changing strategies for programs such as transportation control activities, prevention of significant deterioration, and the attainment and maintenance of standards. A 1973 estimate indicated that 9500 man-years would be required by 1975 and 10,300 man-years would be needed by 1977 to meet anticipated program demands. On the basis of these estimates, the state and local control agencies had approximately 75 percent of the manpower and funds stated as being needed in 1975.

In 1975, 80 percent of the states (including local agencies) expended an effort in man-years and dollars equivalent to 60 percent or more of their stated needs. The number of states with greater than 60 percent of their manpower needs increased from 33 in 1974 to 44 in 1975. Funding increased over 1974 by approximately 14 percent ($18 million) and man-years of effort by 9 percent (600 man-years, all sources). These increases were approximately the same as in previous years. Improvement in resources was principally due to the state and local increase in funds of approximately 20 percent over 1974.